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ON RHEUMATIC CARDITIS.

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The common occurrence of some form of cardiac complication in rheumatic fever is well known, yet I doubt whether the extreme frequency of such affections is appreciated, except by those who have either subjected the cases which they have themselves treated to a careful analysis, or have paid special attention to the facts which have been published by others. In the following paper I shall avail myself of the general conclusions deduced from analysis of the cases which I have treated at the Royal Free Hospital and at St. Thomas's, between 1846 and the spring of 1872, of which the details are published in two reports: one contained in the first volume of the 'Transactions' of the Clinical Society, the other in the third volume of our own 'Reports.' To these reports the following communications must, indeed, be regarded as supplementary.

Of the cases referred to I find that 76 out of 233 had some form of recent cardiac affection, either alone or in combination with previous disease of the heart, giving the proportion of 32·6 per cent., or 1 case in 3·06. In 15 cases also there was old heart disease without any recent affection, or in 6·4 per cent., or 1 case in 13·3. Taking the two series together, we get a total of 91 cases in which there was some form of heart complication, or 39·05 per cent., or 1 case in 2·56 of those treated. This proportion is rather less than has been deduced by some other observers, and I suppose may be

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fairly taken as about the average in cases of rheumatic fever treated in hospital, though it is doubtless greater than obtains in private practice, at least among persons of the middle and upper ranks who come under treatment at the early period of the attack. Dr. Fuller, in his work on 'Rheumatism,' has given a table of 588 cases collected from various sources; some of them recorded by himself in the practice of the different physicians at St. George's Hospital, others reported by Dr. Latham, Dr. Budd, Dr. Taylor, and M. Bouillaud. In these the proportion of cardiac complication ranged from 57·01 per cent., or 1 case in 1·71, in the practice of M. Bouillaud; to 48·03 per cent., or 1 case in 2·06, in the cases treated at St. George's; the mean of the whole being 52·04 per cent., or 1 case in 1·91.

Taking therefore these statements as representing the average results, it will be found that the frequency of cardiac affection varies according to the nature of the attack and the condition of the patient.

The influence of the former is shown in the greater liability to complication in some forms of rheumatism than in others; in the character of the epidemic, the intensity of the disease, and the period from the commencement of the attack at which the case comes under treatment, and also as to whether the seizure is the first which the patient has had, or he has suffered previously.

1. The occurrence of carditis is almost limited to the acute fibrous form of rheumatism. It is seldom if ever seen in the synovial, gonorrhœal, or syphilitic subacute forms, though I have known old disease to exist in such cases, and recent complication occasionally occurs in the malarious cases.

2. There can, I think, be no doubt that the frequency of heart affection in rheumatic fever is influenced by the character of the epidemic, in the same way as pneumonia, typhoid, erysipelas, and other forms of febrile disease vary in severity and in their peculiar features at different times. In my first report I showed that the proportion differed very remarkably in the cases which I had treated at the Royal Free Hospital, at old St. Thomas's, and at the Surrey Gardens; but these differences were probably chiefly due to the regulations in the

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several institutions for the admission and treatment of the patients. Recently, however, the percentage of cardiac disease in the cases treated has differed without there being anything to explain the difference, except the varying character of the disease. Thus, in 1868, the proportion of complication was 20 per cent.; in 1869, 35·2 per cent.; in 1870, 10 per cent; and in the earlier part of 1871, 25 per cent. Yet the cases while in the hospital were placed under precisely similar circumstances, and indeed in by far the largest number, the signs and symptoms of carditis were present at the time of the patients' admission.

3. The frequency of heart affection is much the same in the more severe and in the slighter forms of rheumatic fever, though it is somewhat greater in the former. Thus, while 37·5 per cent. of the severe cases had recent disease, 31·9 per cent. of the slighter attacks were complicated. There is, however, a very striking difference between the kind of complication which occurs in the two sets of cases, pericarditis being most common in the slighter forms of rheumatism, while endocarditis is especially frequent in severe cases. Indeed, while the former is very often seen in cases which are of very trivial character, endocarditis chiefly occurs in severe rheumatic fever, and may be said to be almost a measure of the intensity of the disease.

4. All forms of recent cardiac complication are most apt to arise in the early stage of rheumatism. In only 13 or 14 out of the whole number of cases did the symptoms and signs of disease present themselves after the patient had come under treatment. Occasionally, indeed, the heart affection precedes the development of the external rheumatism, and not unfrequently the two are almost coincident.

5. Cardiac affections are most common in cases in which there have been previous rheumatic attacks. This appears to be very completely established by a calculation given in the last report, from which it is shown that while only 11·3 per cent. of the cases of first attack had any recent complication, disease occurred in 45 per cent. of those in which there had been previous seizures. This inference is also rendered probable by the facts analyzed in the first report, though the previous history in those cases is less satisfactory. It is, however,

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opposed to the conclusion arrived at by Dr. Taylor,[1] who thought pericarditis more common in first attacks of rheumatic fever.

The influence of individual peculiarity on the proportion of cardiac complication is shown by the effect of sex, age, and the previous state of health of the persons attacked.

6. Men are somewhat more liable to suffer in this respect than women. Of the former the proportion of cases with recent heart disease was 35·4 per cent., or 1 case in 2·8. Of the latter, the proportion was 30·69 per cent., or 1 case in 3·3. The difference to the disadvantage of men is probably due to their being more exposed to the causes of the disease, and continuing to follow their occupations for a longer time after the commencement of the symptoms before they come under treatment.

7. A much more marked influence on the frequency with which the heart is affected in rheumatic fever is, however, to be ascribed to the age of the persons attacked. Of the whole 233 cases, 33·3 per cent. of those of 20 years of age and under had some form of recent disease; 29·3 per cent. between 21 and 40 years were similarly affected; and of those between 41 and 53 inclusive, the proportion who suffered was only 16·6 per cent., showing that the occurrence of cardiac complication is much more to be apprehended in young people than at more advanced ages.

8. Cardiac complications are probably also of more frequent occurrence in persons previously out of health and debilitated, though I am not ble to give a numerical statement in support of this opinion. There are few cases of rheumatism of longer duration and more difficult to cure than those which occur in females who have been recently confined or have been long nursing, and I believe that the heart is disproportionately liable to be involved in such cases.

Pericarditis.

Pericarditis is slightly less frequent than endocarditis, but not uncommonly the two forms of affection coexist. Dr. Taylor says that he met with it in only 8 per cent., or 1 in 12·5 of the cases which he treated. My own observations, however, show a larger proportion than this. Of the 233 cases included in the two reports, pericarditis occurred in some form in 36, or

[1] 'Medico-Chirurgical Transactions,' vol. xxviii.

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15·45 per cent., or 1 case in 6·47. This calculation embraces all the cases treated, both those in which there was pericarditis alone, and the cases in which the inflammation was superinduced on old heart disease; while Dr. Taylor does not appear to have included the latter class of cases in his estimate.

The general symptoms which attend pericarditis are very indecisive. Pain especially is a very uncertain symptom. In a large proportion of cases no complaint is made of pain, though generally, when the disease is fully established, there is a feeling of uneasiness or oppression in the region of the heart. Tenderness is an equally uncertain symptom. Sometimes the whole of the præcordial region is tender, and occasionally some pain is caused by pressing between the cartilages or under the left false ribs; but this sensitiveness to the touch may exist in cases of rheumatism in which the pericardium is not affected, and doubtless it has its seat in the integuments or intercostal muscles, and is not in any material degree an assistance to the diagnosis. It has been thought that when pain is felt in pericarditis it is from the presence of pleurisy; but this does not appear to afford an adequate explanation, for the two affections may coexist without there being any material amount of pain; and pleurisy also, whether occurring in rheumatic fever or independently, is often not attended by serious suffering. The presence or absence of pain in both forms of inflammation seems very much to depend on the condition of the patient, and the mode in which the disease is developed. If the patient be very weak and prostrated, and the attack commences in a slight form and gradually becomes more intense, pain may not occur; whereas when inflammation is suddenly developed in a previously healthy person there is probably always more or less severe suffering. The intensity of the inflammatory process seems, indeed, mainly to influence the degree of pain which it causes.

Often in the early stages of rheumatic pericarditis the breathing is very little affected, though it generally becomes short, hurried, and irregular when there is active inflammation and after any considerable amount of effusion has occurred, and sometimes it is so urgent as to compel the patient to sit partly upright in bed. With the commencement of the local affection the pulse is generally quickened, rising to 110 or 120, and with the increase of the effusion it may become very rapid and irregular

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or intermittent. The action of the heart also, which is at first regular, may become embarrassed and tumultuous in the advanced stages, and when there is a large amount of fluid effused.

The tongue, when the local inflammation sets in, is generally altered in appearance. Instead of the white or whity-brown coating, a little disposed to be dry in the morning, which usually attends a well-pronounced but uncomplicated case of rheumatic fever, the tongue will become more thickly coated, the fur of a browner hue and the surface dryer, and sometimes it is decidedly brown and dry. If, indeed, in any given case the tongue assumes the latter character, it may be suspected that some form of local inflammation is present, though it does not follow that the disease has its seat in the heart. It may be either in the pleura or lung.

Sometimes, also, there are symptoms of cerebro-spinal disturbance. The patient may be very restless and excited, there may be slight tendency to ramble or active delirium; or tremor of the extremities and choreic symptoms: the former being especially frequent in men who have been living intemperately, and the latter more particularly occurring in young persons and females.

The only symptom, however, which I believe to be invariable is, that there is a considerable rise of temperature so soon as the cardiac complication sets in; and this rise is often very remarkably seen in cases of rheumatic fever which had been previously of a very slight or trivial character. Thus the temperature, which may not have exceeded 100° or 101°, with the occurrence of pericarditis will rise to 102°, 103°, 104°, or even higher; but the rise of temperature equally occurs if the pleura or lung be the seat of inflammation. I do not know that the condition of the skin is materially altered by the occurrence of any of these local affections, though perhaps it is more apt to become dry, especially during the night, than in ordinary uncomplicated cases of rheumatism.

The diagnosis of pericarditis can only, however, be effected by the physical signs. The first peculiarity which is observed in a case of rheumatic fever when the pericardium is becoming affected, is often a systolic sound, to which I have heard the term "*tension sound*" applied, and I do not know that I can give a better name to it. It gives the impression that the muscular

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contraction of the heart is performed with undue energy. To this a rustling sound succeeds; or, in other cases, the rustle is the first morbid sound heard. At first the rustle is only very slight, barely perceptible, and is heard perhaps only at intervals, as when the chest is distended with air at the end of a full inspiration. It is so short as only to occupy a small portion of the cardiac action, and is not sufficient to mask the natural sounds of the heart. The rustle is generally first heard at the sternum and towards the upper part of the præcordial region, but it gradually spreads over the whole space, and increases in intensity. At length there is a distinct double *bruit de frue frue*, as it is termed by the French, which entirely masks all other sounds. The rustle first heard probably indicates the dryness of the serous membrane, while the decided friction marks the occurrence of exudation. The friction-sounds are characterised by their extreme superficiality; they give the impression of sounds produced immediately at the end of the stethoscope as if caused by the rubbing of the instrument on the skin. They are limited to the præcordial region, or extend from that space equally in all directions. The characteristic sound is double, but sometimes towards the apex there is only a single rub with the systole. The intensity of the sound and the period during which it continues to be heard vary greatly. There may only be the faint rustle, and it may very rapidly disappear, being heard only for a few hours. In other cases the friction sound is very loud and persistent, continuing three or four days or a week, and I have known it distinctly heard for fifteen days. When, however, the sound is very prolonged there is generally some previous disease and hypertrophy of the heart, or the pericardium may be partially attached by old adhesions. In cases of this kind the serous membrane seems less readily to pour out fluid, probably from the pressure upon its surface; in the same way as in cases of pleuro-pneumonia, dry friction may be heard for several days, while in simple pleurisy the friction generally soon disappears from the layers of pleura being separated by the liquid effusion. In the one case the lung being consolidated, is incompressible; in the other the organ readily collapses under pressure. When the friction-sound disappears, it may be by the subsidence of all the signs of disease, but more frequently it is from the outpouring of fluid. The area of dulness is then extended, espe-

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cially in the vertical direction. The friction, however, generally disappears gradually, first below and then above at the upper part and right side of the præcordial space. It may also, in some cases, be for a short time reproduced by making the patient draw a full breath or lean forwards, or in children, by making firm pressure on the chest with the stethoscope. This, however, can only occur when the fluid is small in quantity. When the friction-sound ceases to be heard, the heart's sounds may again become audible, and sometimes they are heard distinctly and naturally, even when there is probably a considerable amount of fluid. More generally, however, they are flat and imperfect, and when there is a large accumulation, much muffled or masked. When also there is much effusion, the area of dulness is very greatly extended, rising to the second or even to the first inter-cartilaginous space on the left of the sternum. The dull space has also a peculiar pyriform shape, being wider below and narrower at the upper part, and often there is a very obvious prominence in the præcordial region. In some cases also, where there is a large accumulation, a wave-like pulsation can be perceived in several of the intercostal spaces. The rapidity with which the fluid is thrown out varies very much, so that in some cases the amount will be very large in a few hours, while in others the effusion will only very gradually increase.

The duration of this stage is also very variable. The effused fluid is generally only slowly removed, but sometimes it disappears very quickly, so that in the course of a few days there may be a very rapid accumulation and equally rapid disappearance of fluid; the quickness or slowness of the effusion and of the reabsorption being probably influenced by the greater or less intensity of the inflammation, and the larger or smaller proportion of fibrine contained in the effused fluid. Most generally, however, the absorption is very gradual, the dulness on purcussion diminishing from above downwards; and as the fluid disappears, the friction sound returns, being first heard at the upper part and right side of the dull space, and gradually falling to a lower level. The returning friction is generally of a harsher note than that which is first heard, and often towards the apex there is only a single systolic sound. The second friction may be only of short duration, or may be heard during a long period, and

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usually, as the cure progresses, the sound asssumes a rougher and more creaky character—the *bruit de cuir neuf*—when the surfaces of the pericardium are becoming adherent. Occasionally also, when the friction, whether primary or secondary, is very marked, a more or less distinct vibration is conveyed to the palm of the hand placed on the præcordia. The prominence of the præcordial space diminishes with the absorption of the fluid, and sometimes this change is immediately detectable by the eye, when there is very little alteration in the area of dulness. The fluid may also be removed without there being any return of friction, and I have known this occur when the effusion had been rapid, and when therefore it might have been supposed that the inflammation was very intense and the fluid charged with a large amount of fibrine. Finally, after a longer time, all morbid sounds may disappear; but I believe that always when there has been prolonged friction, and when therefore it may be concluded that the two layers of pericardium have become adherent, the area of dulness remains larger than it should be. This is, I think, due to the lung being, as it were, pushed aside, so as to bring a larger portion of the heart in contact with the parietes of the chest. It is noticed at the end of the acute attack, and long before it is possible for the heart to have become enlarged as the result of the pericarditic adhesions.

The diagnosis of pericarditis in the early stage is not generally attended with much difficulty. The superficial seat of the friction sound, its peculiar character, and its limitation to the region of the heart or equal extension in all directions from that space, distinguish it from a recent endocarditic murmur. When, however, there is only a single systolic sound heard towards the apex, it may be doubtful whether such sound has its seat in the external surface of the heart or in the mitral valve, and consequently whether there is pericarditis alone, or some recent endocarditis combined with it. Sometimes, also, a cardiac friction sound occurs in cases of pleurisy of the left side, and may be mistaken for a pericarditic sound; but this error may generally be avoided by careful examination. There will, of course, be the obvious signs of pleuritic effusion, and the friction with the action of the heart will only be heard on the left side of the præcordial region. If, on the other hand, the friction sound be really due to pericarditis, it will either be

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heard over the whole space, or, if only partial, will very generally be limited to the right side and upper part of the præcordia, towards the mid sternum.

In the later stages of pericarditis when the lymph is becoming more firm and adhesions are in progress, the sound is often of a creaky, stretching character, and very closely resembles some valvular murmurs, and it may be very difficult to say whether the disease is endo- or exocardial.

Endocarditis.

This form of disease is of somewhat more frequent occurrence as a complication of rheumatic fever than pericarditis. I have met with it in 16·7 per cent. of the cases treated, or in 1 case in 5·9. It is also more common in the severe forms of the disease, while pericarditis generally occurs in the slighter cases.

The general symptoms by which its presence is indicated are even more indecisive than those of pericarditis. There may be some uneasiness in the region of the heart or decided pain; the action of the heart may be quick and irritable; the breathing may be rapid, laboured, and irregular; but all these symptoms are often absent or very slightly marked, and do not generally occur until the disease has been some time in progress, and the valves have become much thickened or exudations or deposits of lymph have occurred upon them, so as seriously to interfere with the functions of the heart. Generally the temperature is more or less elevated with the occurrence of endocarditis. The constitutional disturbance varies with the character of the local disease. In ordinary cases there is simply some aggravation of the ordinary symptoms of rheumatic fever, but occasionally there is what may be termed ulcerative or destructive endocarditis, and in these cases the fever assumes a typhoid type, and bears, indeed, a very close resemblance to ordinary typhoid, the patient becomes rapidly prostrated, and thrombosis of the affected orifice or embolism of the distant arteries, may occur. The diagnosis of endocarditis can, however, only be effected by the physical signs. These consist of murmurs, generally of a blowing character, heard at the different orifices of the heart, and with the acts of contraction or dilatation, or at both periods. If there is obstruction to the flow of blood into the aorta from thickening of the valves or deposits on their surfaces, there is a systolic murmur heard at the

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base and in the course of the aorta. If, on the other hand, the valves cannot properly close or if they are partially destroyed, there will be a diastolic murmur heard about the middle of the sternum. In the mitral valves the disease leads to thickening and to vegetations or deposits on the auricular side of the valves, which should apparently obstruct the flow of the blood from the auricle into the ventricle. In this case the murmur produced would be heard at the time of the auricular contraction, or immediately before the ventricular systole occurs. Generally, however, the sound seems to be systolic, and must therefore be due either to the thickened valves closing less rapidly, or to their not being properly adjusted, and so allowing of regurgitation.

The errors which may be committed in the diagnosis of endocarditis may be the mistaking a murmur which is really due to an old valvular defect for the indication of recent disease, the supposing an exocardial sound to have its origin in the endocardium, or the mistaking a murmur dependent on hæmic conditions for one caused by organic change.

The first two errors may very easily be committed, and can indeed only be guarded against by a careful collection of the previous history of the patient, and by repeated stethoscopic examinations. The third mistake may be avoided by bearing in mind that all forms of cardiac complication generally occur at the earlier periods of the disease, when the symptoms are most active; whereas the anæmic murmurs are heard towards the end of the attack when the patient is becoming prostrated. They are also not attended by an increase of temperature, but usually occur when the temperature has fallen to the natural standard or even below that point. They are generally first heard over the pulmonic orifice or in the course of the pulmonary artery, and are often limited to that situation; or if audible in the course of the aorta or towards the apex, they are almost always to be heard also in the pulmonary artery, and they are genrally accompanied by rough systolic murmurs in the carotid and by continuous murmurs in the jugulars. The anæmic murmurs are usually of a soft blowing character, but sometimes they are rough and croaking, and though often loud, they are also frequently only heard over a very limited space. As the patient's condition improves they become more and more localized to the pulmonary orifice and finally disappear. I need scarcely say

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that serious structural changes so rarely occur in the valves of the pulmonary artery as the result of acute disease, that if in any given case a murmur is heard in that situation, the great probability is that it is anæmic.

Myocarditis.

Myocarditis is rather interesting in a pathological point of view than practically important. It probably always occurs in connection with one or both the other forms of disease, and is chiefly seen in persons previously in a low state of health, and especially in those of dissipated habits.

The subjacent muscular structure of the heart is often more or less involved in affections both of the investing and lining membranes, and occasionally a large portion of the walls have apparently been the seat of inflammation. This is especially seen at the apex of the ventricle in cases of pericarditis, and at the base when the aortic valves have been inflamed.

Sometimes the inflammation of the muscular structure goes on to suppuration, so that the tissue becomes infiltrated with pus, and very rarely a true circumscribed abscess is formed. I have seen one such case, which occurred in the practice of the late Dr. Cragie, at the Edinburgh Infirmary. The abscess occupied the septum of the auricles and was bilocular, and each portion was sufficiently large to have lodged a cob-nut. One portion had opened into the origin of the aorta, and the other was on the point of bursting into the cavity of the pericardium. There was also pericarditis and extensive disease of the aortic valves. The subject of the affection was a female, thirty-five years of age, of very irregular habits, who had suffered from rheumatic pains for several weeks, and in whom the right knee was swollen and tender. She was in a state of great agitation and alarm, but was intelligent when spoken to. She had occasional attacks of severe dyspnœa, but at other times was able to lie down on the back or on either side. The existence of heart disease was not ascertained during life, and indeed was not suspected, her excited condition being ascribed to her intemperate habits. There are, indeed, no means by which inflammation of the muscular structure of the heart could be diagnosed during life, though the reported cases have generally been characterized by hurried and tumultuous action of the heart, feeble and irregular pulse, urgent

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difficulty of breathing, and great distress and agitation of mind and sometimes by active delirium, with rapid prostration of strength.

The *morbid appearances* in the earlier stages of pericarditis consist in the presence of lymph, of harder or softer consistence, on the surfaces of the attached and reflected pericardium, and of a yellowish opaque fluid in the cavity. The solid exudation generally has a peculiar velvety or honeycombed appearance. At the later periods the two surfaces are more or less firmly adherent, and often the lymph is in distinct layers, and at a still later period the adhesions are cellular and the reflected pericardium is with great difficulty capable of being torn off, the adhesions being the most complete at the base of the heart, about the right auricle and between the commencing portions of the aorta and pulmonary artery. Frequently, indeed, when the attachment of the two surfaces is only partial, the adhesions are limited to those positions; and if they be extensive but not universal, the left and posterior surfaces of the organ are the parts which are most generally free.

The milk spots which are so frequently found on the surface of the heart are, doubtless, the remains of slight attacks of pericarditis. They are especially common on the surfaces of the right auricle and ventricle, and almost always coexist with more or less adhesion between the auricle and the trunks of the aorta and pulmonary artery. They are generally capable of being removed from the pericardium, leaving the membrane underneath entire and transparent. That the adhesions and white spots are most common on the right auricle and ventricle is probably owing to the greater force of the left ventricle pushing away the exudation from its surface; while it accumulates, where there is less resistance, or on the surfaces of the right ventricle and auricle and between the large vessels.

In cases of acute endocarditis there is at first only opacity and thickening of the serous membrane, with exudation or deposit of fibrine on the surface. This may assume the form of vegetations about the edges of the valves or of larger layers.

In the aortic valves the deposit may occupy either the ventricular surface of the valve which remains exposed when the segments are closed, or it may occur on the crescentic margin over which the valves when shut come in contact. Subsequently the

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valves become contracted and indurated, and the sinuses behind them shallow, so that they both obstruct the flow of blood into the artery and allow its return into the ventricle. In the mitral valves the exudation chiefly occupies the auricular edges and surfaces, and the folds become adherent together, so as to form a more or less tight ring. The whole of the endocardium both of the left auricle and ventricle, is opaque and much thickened, and in the auricle the surface is often rough. Perforation and breaking down are most commonly seen in the aortic valves, probably from the greater pressure which they have to sustain. Occasionally, also, there is some erosion and softening of the muscular substance at the base of the left ventricle, and in this way passages may be formed leading towards the right auricle or ventricle, the origin of the aorta, or the left auricle. If this occur at what is called the "*undefended space*"—the triangular space between the contiguous sides of the right and posterior semilunar segments, in which the muscular portion of the interventricular septum is naturally partially defective—a communication between the cavities on the two sides of the heart may result, which may simulate a congenital defect.

If during the first or acute stage of the inflammation the muscular substance be much involved, the endocardium and muscle to a greater or less depth may break down under the pressure of the blood, and an aneurismal tumour may result—the *false consecutive aneurism* of Breschet, or the *acute aneurism* of Rokitansky. If, on the other hand, after the occurrence of exudation into the muscular structure, the inflammation be partially recovered from, the muscular fibres may become atrophied and be replaced by fibroid tissue, which, being less resistant, may admit of expansion, and form the *true aneurism* of Reynaud.

Prognosis.

In reference to the prognosis in cases of rheumatic carditis, we must consider not only the immediate danger to the life of the patient, but also the liability to the occurrence of changes in the structure of the heart, which, though unimportant at the time, may lay the foundation of serious disease at a more distant period.

The immediate danger is not great. It very rarely happens that uncomplicated rheumatic carditis proves fatal. Of the 74 cases in which there was some form of recent disease with or without

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old heart affection, three only terminated unfavorably, and in all these there was previous disease—the sequence of former rheumatic attacks—and in one of them the kidney was affected also. The proportion proving fatal was thus only 4·05 per cent.

The danger of the inflammation being only imperfectly recovered from is, however, greater. Thus in 34 cases only out of the 74, in which there was recent disease, did the signs entirely disappear before the patient was discharged from the hospital. In 15 of these cases, however, there was previous affection of the heart at the time of admission, and in these the signs of old disease remained, and the evidence of recent inflammation subsided; but whether the previously existing mischief was aggravated or not it is almost impossible to say. Deducting these cases, there were 54 cases of recent disease only, and in 34 of them the signs entirely disappeared, or in 62·9 per cent., and in several others they were nearly gone—so that the result cannot be regarded as unfavorable. It is quite possible, also, that in some of the cases in which the signs remained there may have been an entire recovery after a longer time had elapsed; and in several instances not included in this calculation, there were slight symptoms or signs of disease at the time of the patients' admission into the hospital which did not more fully develop themselves, and in which the arrest of inflammation may fairly be ascribed to the treatment pursued. On the other hand, however, it must be mentioned that cases do occasionally occur in which patients who have been discharged entirely cured of rheumatic attacks, either simple or complicated by heart affection, return after some months with decided signs of cardiac disease.

The circumstances which influence the result of treatment are chiefly the previous state of health of the patient, the period after the commencement of the symptoms at which he comes under treatment, and the seat and form of the disease.

If the patient be previously in a low state of health, especially if he have any disease of the heart, both the immediate and ultimate danger is much increased. Inflammation of the lungs and pleura, which so frequently occurs in connexion with carditis, and affections of other organs, particularly of the kidney, also adds to the risk.

The recovery is less complete and much more tedious if the

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cardiac symptoms have become fully established before the patient comes under treatment. Thus, of 12 uncomplicated cases of recent carditis, in which the signs were present when the patients were admitted into the hospital, in 7 they entirely disappeared, and in 5 they remained at the time of discharge; while in 12 cases in which the cardiac affection came on while the patients were under treatment, in 8 they entirely disappeared, and in 2 were very nearly gone when the patients left the hospital.

The form and seat of the disease also influence the result. Pericarditis is certainly more readily and completely curable than endocarditis. In 7 cases of recent pericarditis the signs entirely disappeared in all but one, and in that case they were nearly gone; while in the same number of cases of pericarditis and endocarditis combined, they entirely disappeared in only two. The time during which the signs of pericarditis continue is also generally less than that in which endocarditic murmurs are heard. The ready curability of pericarditis is to be ascribed to the comparative state of rest of the inflamed membrane, and to the more purely local character of the disease. Indeed, it probably only becomes dangerous when the accumulation of fluid in the sac is very large. When, however, the valves are inflamed, their constant movement must interfere with recovery. The aortic valves also are liable to become disorganized and to break down from the pressure which they have to sustain; and deposits of fibrine readily take place on the inflamed surfaces, which may produce thrombosis of the orifice, or being separated and conveyed by the current of blood, may cause embolism of the smaller vessels. The mitral valves, though less apt to be immediately disorganized, may equally be the seat of fibrinous deposits causing thrombosis and embolism, and the cordæ tendineæ may give way.

In valvular affections resulting from endocarditis, the danger varies according to the nature of the disease and the particular valves affected. Incompetency of the valves is a more serious defect than simple obstruction. It is also especially dangerous when the aortic valves are affected; whereas obstruction is probably of more importance when seated at the left auriculo-ventricular aperture.

Pericarditic adhesions must necessarily in all cases interfere with the free movement of the heart, and doubtless sooner or later give rise to hypertrophy; yet it is evident that many

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persons survive for years in whom the pericardium has become universally attached. I see occasionally a female, who, many years ago, had peri- and endocarditis, with hemiplegia doubtless the result of embolism, and in whom there is every reason to suppose that the pericardium is adherent, yet she has recovered from the paralytic affection and is in a comparatively good state of health. Indeed, all forms of cardiac defect resulting from rheumatism may be recovered from, and are compatible with the enjoyment of health and vigour for a long period, if proper care be taken by the patient. I know several persons who have had serious rheumatic carditis who are now well and able to undergo a considerable amount of exertion. In all cases, however, the greatest care must be taken to avoid over exertion of body or excitement of mind, and exposure to cold: the former might probably again excite the more active symptoms; the latter would be very apt to be followed by a fresh attack of rheumatism, which would probably involve the heart and aggravate the previously existing mischief.

Treatment.

The treatment which has generally been adopted for the different forms of rheumatic carditis has been either antiphlogistic—leeching or cupping over the region of the heart, the administration of mercurials, &c.; or what may be called expectant —the use of alkalies and salines, &c., as in ordinary cases of rheumatism.

I have long almost entirely abandoned the practice of depletion in any form in cases of carditis; for in a disease which, like rheumatism, is so frequently developed in persons not previously in good health or of delicate constitution, I think all depressing measures very undesirable, if they are not imperatively called for, and I believe that the cases do quite as well when the more expectant plan of treatment is followed. When, however, there is much pain in the region of the heart, the application of a few leeches sometimes affords great relief. Having also seen pericarditis developed in a person under full mercurial action, I cannot think that mercurials are by any means so useful as was supposed by Dr. Latham, though they are probably valuable adjuvants in the treatment when judiciously administered,

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tending to check the outpouring of exudation and to assist the absoption of the effused materials.

I generally adopt, or continue if previously in use, the ordinary rheumatic remedies—the alkalies and salines—such as the bicarbonate, tartrate, citrate, or nitrate, of potash; the liquor ammoniæ acetatis, &c., and exhibit small doses of Hydrargyrum cum Cretâ with Dover's powder, applying at the same time blisters over the region of the heart and following them by poultices. When the liquid effusion accumulates, the iodide of potassium is generally combined with these remedies, being given at first in small doses, and the doses being gradually increased, as otherwise from the ready elimination of the iodide by the kidneys, it is of little use. If the patient be very restless or delirious the Dover's powder is given in full doses, or some more powerful anodyne is administered. When the patient's strength begins to fail stimulants are ordered. It is always somewhat difficult to decide when the time has arrived for the exhibition of stimulants, and it is well to commence their use in very small quantities—not more than a teaspoonful of brandy, for instance—and to increase the doses and repeat them more or less frequently, according to the effects produced. If the remedy answers there will be a very obvious improvement in the condition of the patient: he will be less restless and excited, and the pulse will become fuller and firmer; and when judiciously given, I believe there is no class of cases which derives more benefit from the administration of stimulants than the acute inflammatory affections of the heart.

During the progress of the case I continue the administration of the slight mercurial and the iodide, and repeat the application of blisters and poultices over the region of the heart or paint the surface with the tincture of iodine, till the symptoms and signs of active disease subside. The patient is also kept in bed till convalescence is well advanced, and he is only allowed to lie on the outside of the bed or on a couch till he has gained strength and all danger of relapse has passed away. In a large proportion of cases, the patient becomes anæmic towards the end of the attack, and quinine and iron are then given. When after a considerable time has elapsed, there is still some uneasiness in the region of heart and pains are felt in the joints and other parts of the body, advantage may often be

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derived from the administration of small doses of iodide of potassium, bicarbonate of potash and colchicum, combined with bark or quinine and iron. In such cases, also, relief is often obtained by the application of belladonna plasters over the præcordia, or by simply covering the surface with some warm material.

Of late years I have generally adopted in cases of rheumatism, whether simple or complicated, the blister treatment as recommended by Dr. Herbert Davies. I believe the blisters to be very efficacious in arresting the inflammation in the joints, and, when several are employed simultaneously or in rapid succession, in relieving the constitutional disturbance also. The benefit which results from the treatment is, I think, in direct proportion to the freedom with which the blisters are applied; and, though the first effect is generally to increase the febrile disturbance and raise the temperature for a few hours, the most remarkable amendment, both local and general, ensues. I have been repeatedly told by patients that the pain caused by the application even of four or five blisters at the same time, is far less than that which they had experienced from the disease. In a recent instance a man, whom I had twice previously treated for acute rheumatism, in the one attack by blisters and in the other by general means, told me that he was much more completely and more rapidly relieved by the blister treatment; which was therefore again employed in his third attack. The blisters are applied around the limb above all the affected joints, and the surfaces are poulticed till they entirely heal. Though I have generally employed the ordinary anti-rheumatic treatment in conjunction with the blisters, when the patients have been much exhausted, from the long duration of the symptoms before admission into the hospital, or from their being the subjects of old heart disease, or being weakened by any other cause, as by prolonged nursing, I have sometimes relied exclusively upon the blisters, and have never had reason to doubt the propriety of having done so. In some cases, however, of very severe rheumatic fever, I have thought, on reviewing the cases, that the constitutional treatment might with advantage have been more freely used in combination with the local measures.

In reference to the effect of the blister treatment upon the

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development of the cardiac complications of rheumatism, I believe it is both preventive and curative. As the heart and other internal organs become affected almost always in the earlier and more active stage of the disease, any treatment which tends to shorten the duration of this stage must lessen the liability to the occurrence of such complications; and I have no doubt that more rapid and complete relief of the local inflammation is obtained by blistering than by any other means. I think, however, that the treatment does more than this. I have seen, in cases in which complications were very decidedly threatened, the progress of the internal disease apparently entirely arrested by the application of blisters to all the affected joints at the same time.

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ON THE

STRUCTURE AND FUNCTION OF THE THYMUS GLAND.

By GEORGE RAINEY,
DEMONSTRATOR OF ANATOMY.

The thymus gland is a temporary organ, situated in the anterior mediastinum, and extending from thence through the upper opening of the chest, in some subjects as far as the lower border of the thyroid gland. Such is its situation and extent at birth, after which, gradually increasing, it attains its full size about the termination of the second year, when it generally begins gradually to diminish, so that at the age of puberty it will have almost disappeared. This body consists of two lobes, which mostly differ in size. Each lobe is made up of smaller lobules, of which each has the appearance of being hollow, and lined more or less completely with vessels, but these have neither the size nor the arrangement of capillaries.

From the appearance, figured by Kolliker in page 187 of Busk and Huxley's translation, and copied into all text-books, it might be thought that the cavity (*a*) contained neither capillaries nor corpuscles of any kind. I have in my possession, however, specimens of the thymus gland, in which the vessels have been injected with fine vermilion injection, and in these the cavity corresponding to (*a*) is filled with very fine capillaries, apparently naked in fluid or semifluid material by which this cavity appears to be distended (Pl. I, fig. 1). The semifluid mass is permeated by the capillaries in exactly the same manner as is

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found in viewing a section of a similarly injected Peyerian follicle (Pl. I, fig. 2). It must be borne in mind that the contents of the latter are considered by some to be analogous to or identical with lymph-corpuscles.

The lymphatics of the thymus gland are numerous. According to Sir A. Cooper two large absorbent vessels pass downwards and terminate in the jugular veins; and there is represented in one of his plates a large absorbent trunk terminating in the vena innominata, and, according to Cruveilhier, the lymphatics of the pericardium and thymus enter the internal mammary, anterior mediastinal, and bronchial lymphatic glands. Those of the thymus gland, therefore, communicate with the bronchial glands, and hence through the medium of these glands they communicate with the lungs

Now, considering the numerous communications of the thymous gland by means of these ducts with other parts, especially with the lungs through the medium of the bronchial glands, and noticing the character of the pulp contained in the central and other parts of the thymus, in which are present numerous bodies similar to those found in the chyle, we have some reason for supposing that the thymous may be neither more nor less than a lymphatic gland. With a view to test the accuracy of this supposition, it will be necessary to consider the condition of the lung of the fœtus in utero at the termination of the natural period of gestation. This may easily be done by removing a fœtus of any kind from the parent animal at the full period whilst under water, when, on testing the weight of the lung, it will be found to sink in the water, showing its specific gravity to be greater than that of the fluid in which it was immersed; this is a test with which almost every one is familiar. If the fœtus have been allowed to take some inspirations, its lungs will float in the same medium. Hence, in this case, the lungs must have lost that to which its former specific gravity was due.

In order to fully examine this point lungs of different animals, and those of the several animals of different ages, were examined with the microscope, having been previously injected with fine vermilion injection. By this mode of proceeding the capillaries in the walls of the air-cells and air-passages, being all filled with injection, the form and size of these parts were accurately defined, and thus the exact situation of any material occu-

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pying these several spaces could be easily and clearly determined. The vessels of the air-cells were distinct and well defined, so that the precise situation and form of the material with which these spaces were filled were very exactly defined (Pl. II, figs. 3 and 4). This material was a translucent semifluid material, of a granular character, in which were globular particles of a decidedly oily character, giving to the material taken altogether the appearance of being in a state of what is called "fatty degeneration."

Now, considering the quantity of blood-vessels which have been formed in the several parts described, the material which I have just described may be considered as the blastema in which these vessels, and doubtless other structures, were originally formed, and which perhaps was now in a state of what is called fatty degeneration. The probability of this being the correct explanation rests upon the fact of its being a necessity that this material must, sooner or later, be removed from the cells and spaces after the animal begins to breathe. Now, suppose a fœtus in utero to have arrived at the period of its birth, its lungs, as shown by experiment, are heavier than water, and as yet have every part of them inaccessible to the external atmosphere, and, besides, if the respiratory muscles were to act, no air-cells being open, no air could be received into the substance of the lung. Doubtless the first act in the process of respiration is inspiration, but that this may not be useless a space must be prepared for the reception of air, and that could be done only by one of these viscera, which is organised for the purpose, as by a lymphatic gland; and if the thymus is not such a gland, there is not one in the body. But it may be said that, admitting such to be its office, it ought not entirely to vanish after it has done with the lungs; its other less obvious connections require that it should still remain in existence. The great difference in the amount of work which the thymus, as an absorbent gland, had to do in the early stage of the development of the lungs, and afterwards when the lungs are used as breathing organs, seems to me to be that in the fœtal stage it has to prepare the lungs for receiving its first and earlier portion of atmospheric air, whilst afterwards its use will probably be confined to keeping these organs in regular action.

Mr. Gulliver details the effects produced by chemical re-

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agents on the corpuscles of the thymus, arguing the identity of these with the globules of the chyle and lymphatic juice, and believes the thymus to be an additional gland for the elaboration of the nutrient matter, peculiarly provided to meet the wants of the economy at the precise time when these wants are most urgent.

Concerning this theory Mr. Simon observes, that "no attempt has hitherto been made, amid the new school of physiology, to expound the structure, or inquire the use of these organs, in the cautious spirit of philosophical generalisation." My attention was first turned to this subject as early as May, 1850, about which time I made some minute injections of the thymus glands of different animals, and also similar preparation of Peyer's glands; these preparations are now in the possession of St. Thomas's Hospital. On comparing these specimens I was struck with their resemblance, and submitted them for examination at the time to my friend Dr. Bristowe, among others. Fig 1 represents a vertical section of Peyer's gland taken from the pig. Fig 2 represents a section of the thymus gland.

The minute points of resemblance connected with these general characters, which have been detailed in the preceding part of this paper, seem strongly in favour then of their being similar organs, and therefore their functions may be equally the same; that is, in both cases they are simply absorbent or lymphatic glands. There is no fact better known to medical men than that the lungs which have never been inflated sink in water —a fact showing that some preparation, that is, that something must be got rid of before the lungs are fitted to perform the functions of respiration; now this fact is sufficient to lead to the examination of lungs of different animals at different ages. Now, at first the air-cells are filled with the blastema in which the tissue and the vessels and nerves were formed. In the lung of the fœtus the air-cells are much more advanced in their formation than any one who has not seen a minutely-injected lung would imagine; but these cells are not empty, otherwise how could the lung be moulded to the form and dimensions of the chest? If the lung be examined at different periods after birth, the cells will be seen, especially if the vessels be properly injected, to contain a considerable portion of a semifluid substance, mixed more or less with oil-

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globules in a state of fatty degeneration, that is, it has assumed a more absorbable form. Notwithstanding, it is an organ of respiration, and hence these air-spaces must be filled, more or less, according to the system, with atmosphere; but they cannot take in air before they have got rid more or less of their contents. It may be thought that it can be got rid of by a voluntary act of coughing. But what is the first act in the process of respiration? If the lung were full no inspiration could take place; or if it were more than full, then there could be no expiration.

But it might, perhaps, be said that the thymus gland ought to disappear after the process of respiration has been fully established. This is exactly the case, for the process of respiration is not fully established for some time after the birth of the animal, and the form of the lung will require some time to mould it to the form and size of the chest. Besides, there are other absorbents connected with the thymus gland in addition to those directly connected with the lungs.

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EXPLANATION OF PLATES.

FIG. 1.—A lobule of the human thymus injected and divided longitudinally. The centre is seen filled with soft lymphoid material.

FIG. 2.—Vertical section of two follicles of a Peyer's patch injected. The mucous membrane covering their pointed ends has been removed.

FIG. 3.—Portion of goose's fœtal lung injected, showing air-tubes partly filled with albuminous material.

FIG. 4.—Section of human fœtal lung injected. The air-spaces are filled with translucent material, which in places has been disturbed.

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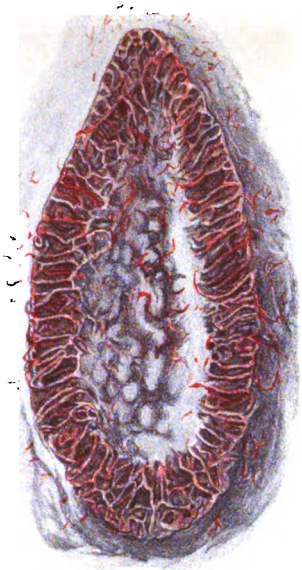
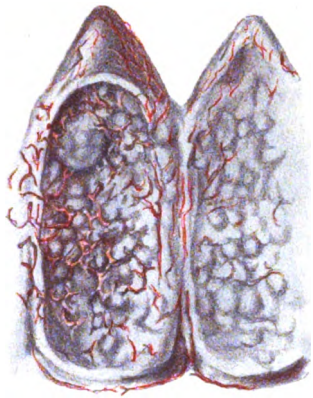
Fig. 1.



20 diams.

Fig. 2.



25 diams

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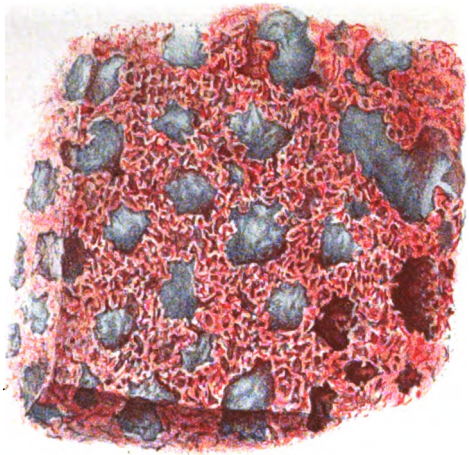
Fig. 4.



60 diams.

Fig. 3.

40 diams.

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ON THE

WORKING OF THE SALE OF FOOD AND DRUGS ACT, 1872.

By ALBERT J. BERNAYS.

It may be of some general interest to put upon record some facts connected with the working of the Adulteration Act, as they have come under my observation while engaged in carrying out the Act in two large districts of South London.

One of the greatest evils connected with the subject of adulteration lies in the want of appreciation on the part of the general public of any good to be accomplished by Act of Parliament. Indeed, the subject itself seems a matter rather for jesting than for disapproval, seeing there are not a few who regard successful fraud as a sign of smartness.

When we consider how little the poor are able to defend themselves, it does seem peculiarly the province of the vestries to carry out such an Act in a manner not only to protect the interests of the consumers, but to give the benefit to the many upright tradesmen who are undersold by the few who are unjust, or who are unconscious of selling a spurious article.

Without wasting a line of unnecessary space, I would call attention to the improvement in the quality of certain articles of food accomplished through the working of the Adulteration Act of 1872.

In the matter of MILK. In reply to the question, what is milk? I would say, the whole of the secretion in the udder

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of the cow. Not the first stripping, which is poor in butter, or the last, which is so rich in cream; the mixture constitutes milk. Assuming 9 per cent. of solids, other than butter, to be a perfectly fair standard for milk, and 0·7 as a normal amount of ash in the total solids, which ash pertains principally to the solids not fat, there is now no difficulty in giving a fair opinion as to milk. Thanks especially to the labours of Mr. Wanklyn, and to the standard of milk so generally assumed by public analysts, the opposition of vendors has been to a great extent disarmed. Honest milkmen, of whom there are many, are in favour of the Act being rigidly carried out. But it was not so at first. The standard of milk was so low that there was danger of the setting-up of London milk as a standard for judgment.

In a case of dispute which I call to mind I informed the vendor that if he could produce such a milk, as the one upon which judgment was given, from any one of his cows, I would confess my error and repair the supposed injury. But the result far more than confirmed my opinion. Even in the matter of cream, instead of the 7 per cent. found, the average was 12·94 in December, and only one was as low as 9 per cent.; and the average ash amounted to 0·69 per cent.

The effect of the working of the Act as regards milk in one parish was as follows:

In the first period	. .	48 per cent. of adulterations.
In the second period	. .	45 „ „
In the third period	. .	11 „ „

Let us compare two milks sold at the same price, and ask ourselves what would be the difference in effect, as chief or sole article of diet, upon any young child:

Sp. gr. 1·014		Sp. gr. 1·033	
Total solids . .	5·73	Total solids . .	13·02
Water . . .	94·27	Water . . .	86·98
Fat	1·58	Fat	3·77
Solids* not fat .	4·15	Solids* not fat .	9·25
	100·00		100·00
*Ash in solids . .	0·47	*Ash in solids .	0·75
Salt in ash . .	0·23	Salts in ash .	0·11

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Surely it is not too much to say that, owing to the injury to infant life from the administration of such milks as the first, the vendors stand forth in their relation to the public as slow poisoners. There is the less excuse in the case of milk, because the lactometer tells a story which, although not the whole truth, would afford a fair means of judging. And the vendor could, at least, defend himself much better if he were to appear in court with a daily registry of his observations.

The effects of keeping milk have been several times illustrated, and that too in a most interesting manner. In the case of one sample I found 8·94 per cent. of solids; on repeating the analysis the second day the total solids had diminished to 8·47. The same milk, twenty-five days later, contained only 7·84 per cent. of total solids. The better the milk the longer it will keep. In other respects, much depends upon the time the milk is kept, the temperature, and the amount of air in the bottle. Again, the better the milk the less likely is it to become offensive when kept in a well-closed vessel.

The necessity for an analysis in duplicate I have always upheld; in the case of milk it is the more imperative, because it is often very difficult accurately to estimate the fact after forty-eight hours. One hold the defendant always possesses over the prosecution: the water in any subsequent analysis should always appear higher than in the public analyst's analysis, the ash remaining the same.

A very curious illustration of a very doubtful case is furnished by the milk marked A, in which instance we see what top-skimming can do. The case seemed to me to prove, not only that the vendor knew that the milk was taken for analysis, but also one of two things: either that the seller did it in contempt of the analyst and the authorities, or, knowing it was adulterated, as the only mode of escaping detection. Believing the latter to be true, I urged upon the inspector the necessity of taking another sample. The visit of his substitute, a girl, gave me the desired opportunity of making a second analysis, with the result as given in B.

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	A.	B.
	Sp. gr. 1·020 Cream 61 per cent. Total solids . 22·37	Sp. gr. 1·029 Cream 4 per cent. Total solids . 4·00
Water . . .	77·63	90·11
Butter-fat . .	15·04	1·99
Solids* not fat . .	7·33	7·90
	100·00	100·00
*Ash in solids	0·58	0·57
Salt in ash .	0·14	0·08

It may not be uninteresting to mention that six samples of milk were taken and received by me on a Sunday. This was for the purpose of testing whether the sanctity of the day had any effect upon the morality of the vendors, or whether it offered complete immunity. Of the six samples four were adulterated with water, one was skimmed, and one was genuine.

There is a very common opinion that the low specific gravity of a milk is often occasioned by frequent dipping. Now, the contrary is the case; but, as this opinion has been constantly advanced in the police courts, it may be as well to give it a decided contradiction.

Another difficulty is connected with the working of the Act by the magistrates. One of them, before whom one of my cases was brought (in which, by the way, a conviction was obtained), has since declared that he will not consider milk adulterated if it only contain "10 per cent. of water." The magistrate, whose statement I quote, mentions the opinion of Dr. Voelcker as his justification. But I think I may say that Mr. Wanklyn's experience, and that of so many other public analysts, ought to be considered to the full as valuable, Mr. Wanklyn's work ON MILK being our accepted authority at the present time. For myself, I have lost no opportunity of informing myself on this point. Ably assisted by Mr. C. G. Stewart, and also by Mr. Woodman and Mr. Clayton, jun., I have had samples of milk forwarded to me from time to time, so that I might acquaint myself with the changes the milks underwent from month to month in the varying seasons, and have found the standard we adopted to be a perfectly legitimate one. From my experience in Camberwell I can safely say that many an honest vendor might, from the

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quality of his milk, have added 10 per cent. of water, and it would have fairly passed muster; and I am well assured that this system has been practised by those who are not equally upright. If on the same day, in a district with which one was well acquainted, we could find a series of milks with the solids not fat depressed below 9, or even 8·5, I should distrust my own judgment. No system of fines could raise the general standard of milk, as is admittedly the case; the opposition to the Act is now almost entirely on the side of the dishonest.

That the amount of BUTTER may vary in milks is a well-admitted fact, but the standard adopted by analysts is so low as to make due allowance for it. The effect of the new Act with reference to abstraction of CREAM has not been sufficiently tried, nor indeed do we, at present, know a single fact with reference to the better working of the Act of 1875.

Next to milk comes BREAD as the most important article of food. In my early experience I have met with frequent adulteration with alum, but this has entirely disappeared. As long as the seasons are fine there is no reason for the employment of alum. But if, from circumstances over which the baker has often no control, the gluten of the flour should be in a moist condition, it undergoes changes that produce an action upon the starch which makes the resulting bread heavy and sodden, and which has led to the employment of alum. Instead of using alum the process recommended many years since by the late Professor Liebig should be brought into vogue when the gluten is unsound. One hundred parts of flour are to be mixed with twenty-six parts of lime-water, and a sufficiency of common water, so as to make the dough of a proper consistency.

When first I had to deal with bread under the Act of 1872, it was a question whether rice-flour might be admixed without a declaration to that effect; it has now been settled by one learned magistrate, Mr. ELLISON, that such admixture must be stated. Without in the least denying either the wholesomeness or the pleasantness of rice, it must be remembered that rice only contains one half of the nitrogen of wheaten flour, and gives to bread the power of holding a slightly larger percentage of moisture.

Connected with the subject of bread I was astonished to find how mere a trace of common salt was employed by some bakers in

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the manufacture. As the children of many poor people obtain all the salt they take as food either in their bread or their butter, if salt be absent from their bread an unhealthy condition of body must be engendered. I am glad to think that the advice I have given as to the use of half a pound to every hundred-weight of bread has been so uniformly accepted that this source of mischief has nearly ceased.

BUTTERS, as might be expected, offer a very great variety of work. Some, which are quite genuine, are remarkable for their nastiness. Evidently many samples, which are spoilt for the nigher markets, are worked up again for the benefit of the poorer classes. One is filled with astonishment that any can be found who can eat such rank products. To say nothing of the impurity visible to the naked eye, the taste *ought* to be sufficient, but it is not so.

In the early part of 1873 water was a very common form of admixture. It could not have been from water left in, because as buttermilk it would have told its tale; but water to the extent of even 20 per cent., and sometimes as much as 9 per cent. of salt, were introduced. A certain amount of water is necessary in order that butter should be tasty, and 10 per cent. is not too much for that purpose; but in more recent times, as now in 1875, we have butters in which there is no butter, an almost absence of water, only 2-3 per cent. of salt, and fatty acids to the amount of 93 per cent. A curious feature is the freedom from curd, which, in a cheap butter, is very suspicious.

SACCHARINE FOOD and SWEETSTUFFS have been frequently examined, and have stood the tests well. What change for the better has the cheapening of sugar brought about, rendering it now perfectly safe to buy sweets at almost any shop! And now that Free Trade is established, the likelihood of recurrence to such adulterations as were common twenty years ago is utterly improbable. But in examining JAMS, unless of such firms as Crosse and Blackwell, one wonders at the revelations made by simply washing with water: in one case a large piece of a play-bill printed in letters of red lead; in another, and another, and yet another, the fruit as bad as possible, and with every kind of impurity that soil and carelessness could introduce. In two other jams I found a considerable trace of copper, amounting to as much as 1½ grain per pound. Of course no one would

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impute the introduction of a salt of copper as of set purpose, but a most blameable neglect of proper precautions as to the vessels employed and the mode of using them.

Few articles of food have produced so great and so intemperate an outburst of indignation against public analysts as TEA. The very justice of the remarks has brought such annoyance to some highly placed people, that they have not only used language the most unjustifiable, but have been instrumental in obtaining alterations in the Adulteration Act of 1872 which are certainly not improvements. Every one knew that coloration was general, but I hold that that kind of adulteration would not do a man as much harm in a twelvemonth, as he does himself by a single instance of excess, either in eating or in alcoholic drinking. The greater portion of the colour remains in the leaves, in the pot, or at the bottom of the teacup. It is not so much as to the colour of the tea, but as to quality, that the public requires information. The smaller tradesmen need this education as much as do the poor, and they are often themselves quite ignorant of what they purchase. It is as educators that the public analysts might be employed, and in this respect alone would be as useful as in assisting the vestries in punishing any but the fraudulent. Take, for example, a tea with 13 per cent. of twigs, with leaves for the most part broken. An educated eye would have at once rejected it. If a museum of common things were attached to every Board School, it would prove of great advantage to the rising generation. Some infused COFFEE, as sold in the streets and partaken of by working men, was about equal to the beverage they give you at the Crystal Palace. It is not to be wondered at that people prefer strong drinks, when we remember the "tea" and the "coffee" of our places of public resort. The admixture of chicory in some of the "prepared coffees" is so large in proportion to the latter that it is medicinal in its effects. I think our legislators might have insisted upon the principal ingredient standing first in description; we should then have had chicory and coffee, instead of coffee and chicory, in a case where five parts of chicory were mixed with one of coffee. So again, a prepared cocoa, rich in sugar and starch, contained very little cocoa; but, as it was sold, I can assert that it answered to its title. Then, as to MUSTARD, the public, if well advised, would

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soon learn the difficult task of mixing flour without paying for the latter as mustard. But if I exercised any choice in the selection of articles for analysis, I should never trouble myself with such an one, as I would advise persons to use the genuine article outwardly, and only under medical advice.

From my experience PICKLES have fairly stood the test of an exhaustive examination. But here again, without any suspicion of adulteration, the toughness of some of the vegetables preserved ought to prove a sufficient caution against a second purchase from the same store.

In concluding this brief report of my experience as public analyst, I would express my conviction that *systematic* adulteration is not nearly so extensive as in the days gone by. The drink of the people will, however, require constantly looking into, whether it be in the form of water, milk, beer, wine, or spirit. As regards BEER, I have found it stronger in alcohol than is generally supposed, and I think this would account for drunkenness when the quantity sometimes imbibed is taken into consideration. And as to WINES, I hold that a wine merchant who should publish the alcoholic strength of his wines, as well as the amount of sugar and acidity, would be a benefactor.

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TWO SURGICAL CASES OF INTEREST.

By NELSON C. DOBSON, F.R.C.S.,
SURGEON TO THE BRISTOL GENERAL HOSPITAL, ETC.

The two following cases, which were under my care in the Bristol General Hospital, present features of special interest, both clinically and pathologically, and merit, I think, more than a casual notice.

The recorded cases of tumour of the soft palate are so few, and the general literature of the subject apparently so defective, that I have published this case in the hope of remedying, in a small measure, this deficiency. In one large book of upwards of a thousand pages, which treats exclusively of the surgical diseases of the mouth, I find no mention of tumours of the palate, nor, indeed, have I been able to find anything like a parallel case to mine in any of the several standard surgical works which I have consulted; but in the 'Lancet' of February 28th, 1871, a somewhat similar case is described by Mr. King, of Hull, and as this is the second case of tumour of the palate which has come under my notice in a short period, I cannot think that they are so rare as the scanty records might lead us to suppose. Apart from all other circumstances, this case is of interest on account of the enormous size of the growth, and the entire and uninterrupted success of the operation which was performed for its removal, an operation which promised to be as formidable as any surgical operation could well be, but which in reality did not give me much trouble.

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CASE 1.—*Tumour of the Soft Palate.*

The patient was a Welsh woman (and I might add that most of the unusual cases in surgery which we meet with in Bristol come from Wales); she was 22 years of age, healthy, strong, and well nourished. Eight years ago she first noticed a little lump just below the ear, and from this little lump she fancies the growth which now fills up her pharynx must have originated; at any rate, the swelling increased gradually in size, giving her but little pain or inconvenience. Within the last few months it has increased much more rapidly, and given her pain in the left side of neck and in the ear of the same side; she now began to experience a difficulty in swallowing; she sleeps well, and does not complain of any sense of suffocation. Externally there is very little to be seen beyond a projection under the angle of the jaw; this projection is of the size of a chestnut, and it was thought to be the submaxillary gland, but further examination showed it to be connected with the mass of the tumour; there was also a decided prominence behind the ramus of the jaw on the left side, which was more definite when the mouth was widely opened. On looking into the mouth there was a large uneven mass filling nearly completely the pharynx, extending from left to right; originating in the left side, it had gradually extended itself to the right; pushing over the right side of the palate and uvula, so that they were approximated to the right tonsil. There was barely room for the finger to pass by into the pharynx beyond. The mucous membrane of the palate on the anterior aspect of this large mass was, as far as could be judged, pretty free from adhesions. The tumour evidently was situated *in* the left half of the soft palate, between the mucous membrane on the anterior aspect and the muscles of the soft palate behind it. It was impossible to decide accurately whether the tumour was adherent to the base of the skull, as it was too large to admit of the finger passing completely around it on the right side, which side only was free; on the left side it filled up every available space in the pharynx, projected also under the angle of the jaw so as to be felt externally, and also extended a considerable distance behind the ramus of the jaw. The accompanying drawing will

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explain the position of the parts, and give an idea of the size and character of the tumour. It is of the same size as the original, and I am indebted to Monsieur Durond for the faithful representation of this as of the succeeding subject. It forms the right-hand figure in the accompanying plate.

A is the part seen on opening the mouth; it was then covered only by mucous membrane.

B. The part projecting below the jaw, and on to which I made the external incision which enabled me to liberate most of the mass.

C. The part projecting behind the ramus of the jaw.

(N.B. The tumour is represented as occupying the position it did before removal.)

July 17th.—After a consultation the case was looked upon as so formidable, and the risks of any operation so great, that it was thought advisable for the patient to consult her friends again after having the risks plainly put before her, previous to any operation, one of my colleagues thinking that it might possibly be necessary to remove part of the lower jaw and another part of the upper jaw, whilst a third thought it not unlikely that the common carotid artery would have to be tied before the operation was completed, if indeed it were not done as a preliminary, as in Mr. Kelburne King's case. Under these circumstances I sent her home, and she returned again to the hospital in a few days, and on March 12th, 1875, I removed the tumour in the following way. The patient having been fully chloroformed, and the mouth kept forcibly open by a wooden peg placed between the back molars of the right side, I thrust my left index-finger to the back of the tumour, so as to bring the point *B* as near as possible to the surface of the skin. I then made a free incision about two inches in length, quite down to this portion of the tumour, beginning a little behind the angle of the jaw, and cutting through integument and muscles; through this incision I passed my index-finger of the right hand, and with very little force and no further incision in this position was able to break down all the posterior adhesions of the tumour; it had a rather firm adhesion to the styloid process of the temporal bone, but this, like the rest, was readily

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overcome, and in a few seconds the back part of the tumour was completely detached. I next made a free incision about 2½ inches in length over the front of the mass, through the anterior surface of the soft palate, and by a little dissection and a free use of the handle of the scalpel this surface was easily cleared. The tumour was now lying loose, and by passing two fingers of the left hand through the palate wound, and two of the right hand through the skin wound under the jaw, I was able by a little manipulation to deliver the tumour safely through the mouth. There was a little difficulty in getting it through the teeth on account of its size, but in all other respects the operation was as simple as it was successful. There was free oozing at the moment of separation, which yielded to pressure, and no vessel was tied. After the removal of the tumour there was a large hole in the palate, but as it was confined to the anterior portion of the palate and had not extended through its entire thickness, I left it to heal without stitches. In a few days, as the wound healed, the uvula and palate regained its normal appearance, her voice its natural tone, and though it was necessary for a day or two to feed her with a stomach-pump tube, yet when she left the hospital quite well on April 8th, within a month of the operation, there was nothing in the condition of her palate or pharynx to indicate that their functions had so long been interfered with. The tumour proved to be a fibro-adenoma, there being distinct patches of glandular structure with large quantities of fibrous tissue.

In a similar case to the above, the only one I have been able to find on record, Mr. King, of Hull, found it necessary to tie the common carotid artery, to saw through the lower jaw, and cut up the cheek as far as the ramus of the jaw. Mr. King's case did not come under my notice until some time after my own operation. I believe I could safely have removed the tumour in my case through the mouth alone, but made the external incision under the jaw by the advice of my senior colleague, Mr. Coe, lest I might at the last have severe hæmorrhage, which would be difficult to restrain without some external wound.

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CASE 2.—*Dentigerous cyst in lower jaw from non-erupted wisdom tooth; excision of right half of jaw; recovery.*

Louisa N—, æt. 38, a machinist, with good family history, was admitted into the Bristol General Hospital under my care, March 31st, 1874. Was always pretty well up to ten years ago, when she noticed a small swelling near her right ear, which caused her great difficulty in opening her mouth; about this time she had a double tooth removed (second molar). She does not remember to have had more than one double tooth on this side removed, and can give no history of her wisdom tooth. Her first molar is still present and sound. The tooth also which was extracted was sound, and at the time of its extraction a quantity of "discharge" was let out. The swelling has gradually increased in size from that time until now, but more rapidly in the last few months. The swelling does not prevent her from working, sometimes gives her difficulty in eating, but never much pain.

At *present* the patient is in fair health, there is a large oval-shaped, uniform, hard swelling on the right side of the face, occupying the position of the ramus and body of the jaw, perfectly immovable except with the jaw, and evidently an expansion of the plates of the jaw, as a similar, though less, degree of swelling could be detected by the finger on the inner surface of the jaw; at one spot on the facial aspect, opposite the first molar tooth, there was a small swelling about the size of a walnut, distinct from the uniform enlargement, and at this place there was fluctuation and some crackling as of a thin bony cyst, and this was more apparent when one finger was placed on the outer side of the cyst and the other over the alveolar process at the vacant socket of the second molar; the swelling in other parts was firm and resisting. The mucous membrane of the mouth is everywhere perfectly healthy. She cannot open her mouth very wide, but still sufficient to take food fairly. This was the state of things, and being anxious to try some milder measures before proceeding to excision, I, on April 2nd, after a consultation with my colleagues, made an incision in the mouth over the alveolar process, corresponding to her last two molar teeth; some glairy fluid escaped; I then

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passed a long probe through this opening, which made its appearance at the posterior surface of the angle, having passed between the external and internal plates of the jaw; an incision was then made through the skin, and a drainage tube made to follow the probe and kept in position, one end being in the mouth and the other draining through the skin incision; the bony walls were too thick and unyielding to allow of any crushing. A poultice was applied, and there was a free discharge until May the 2nd, when, there being no diminution in the swelling, the drainage tube was withdrawn and the patient sent out of the hospital none the better for her treatment. I kept her under observation, and she was again admitted in September of the same year; and as the tumour was evidently increasing in size and causing her more pain and inconvenience, I determined to excise the right half of the lower jaw; this I did under chloroform, by an incision extending from the lobule of the ear along the posterior border of the ramus and under the horizontal portion of the jaw as far as the first bicuspid tooth, and then made a vertical incision from the angle of the mouth joining this, reflected the skin, sawed through the bone at the socket of the second bicuspid, which I had previously extracted, and disarticulated at the condyle in the usual way, experiencing difficulty only from the fact that the coronoid process was so enlarged, that in depressing it to get at the insertion of the temporal muscle, it came in contact with the posterior surface of the malar process of the superior maxillary bone; however, I soon overcame this difficulty, and had very little bleeding. The patient's future history was one of uninterrupted progress towards recovery.

Description of parts removed.—The accompanying drawing shows pretty faithfully the portion of jaw removed. Fig. 1 (the left-hand figure in the first of the plates accompanying this paper) shows the parts as removed in their entirety, whilst the other drawings (fig. 2, A B, in the second plate) show the interior of the mass as sawn through the centre from above downwards.

It will thus be seen that the whole of the right inferior maxilla behind the last bicuspid tooth was entirely removed.

There was a prominent thin-walled cyst occupying the whole of the horizontal portion removed, this cyst being chiefly developed in the outer wall of the body of the jaw; behind this

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the whole of the angle and ramus is seen to be uniformly and evenly enlarged, the enlargement being most prominent in the facial aspect, though it extends also to the oral surface. The coronoid process, instead of having its normal somewhat pointed character, is broad, blunt, and expanded, so much so that it filled nearly completely the zygomatic fossa, and it was wedged tightly into the anterior part of this fossa.

Turning now to the interior as shown in the vertical section it will be seen that the *external* plate of the jaw is the most expanded, and the ramus hollowed out in a large cavity, which in the recent state was lined by a smooth membrane, similar apparently to mucous membrane, whilst the posterior part of the cyst was cut off from the anterior by a vertical septum, the walls of this cavity were thickened, and especially thick at the upper and lower surfaces. The internal plate shows, though to a smaller extent, corresponding structures to those observed in the outer, but with the important addition of what appears to have been the origin of all the patient's troubles, viz., the fully developed but non-erupted wisdom tooth, the whole of the swelling and bony expansion being the ordinary dentigerous cyst, unusual only in the fact of its size and the great bony thickening. The crown of the wisdom tooth was covered by a dense fibrous membrane, and the cysts' bony walls were so thick that I believe, even with the full light of an accurate diagnosis, that any less formidable operation than that which I undertook would have been useless. At any rate, the attempt to crush the cyst-walls and the drainage tube gave no relief, which, with the removal of the offending tooth, is generally sufficient in ordinary cases for the successful treatment of dentigerous cysts. There was a difficulty in ascertaining whether the patient had had one or two teeth extracted, and the offending wisdom tooth could not be discovered, though the possibility of its non-eruption was not lost sight of. Another point worth recording is that my dental colleague, Mr. Parsons, with much ingenuity, fitted the patient with an efficient substitute for her lost jaw, so that she masticates on that side with comparative ease, the only drawback being that her muscles contract so strongly that her apparatus is constantly requiring repair. This artificial substitute was more readily adapted by reason of the genial tubercles of both sides, with their attached muscles, being undisturbed.

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DESCRIPTION OF PLATES.

PLATE I.—Right-hand figure represents the tumour removed from Case I, natural size.

Left-hand figure represents the view of the lower jaw from Case II, seen from above and in front

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PLATE II, A B, represent the tumour of the jaw in Case II, divided longitudinally.

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Fig. I

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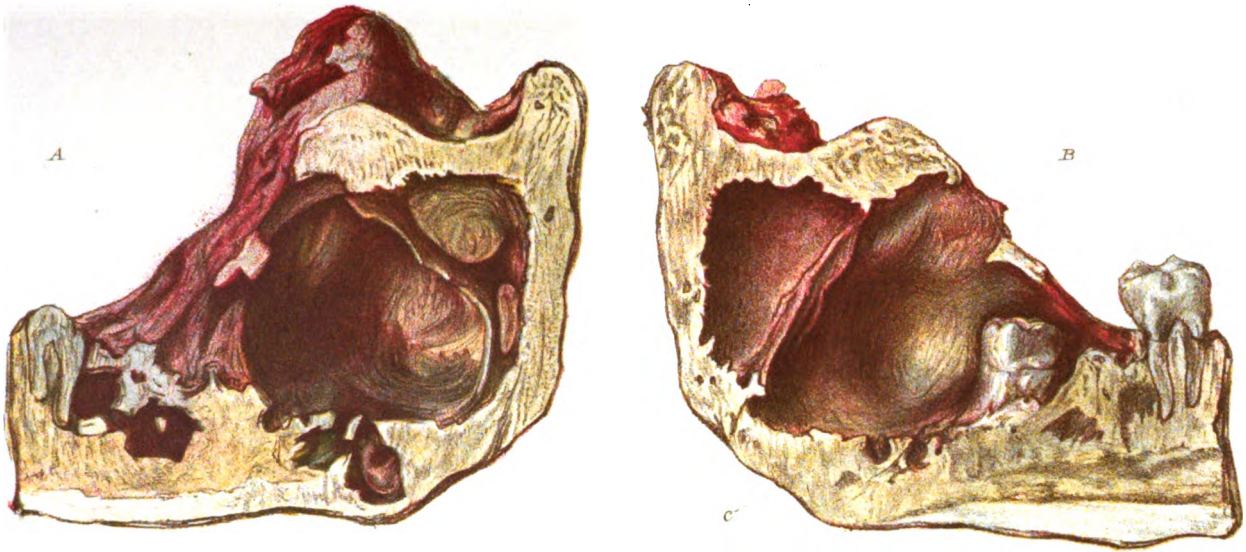
Fig. II.



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AN UNUSUAL FORM OF FRACTURE OF THE FIBULA.

By W. W. WAGSTAFFE, F.R.C.S.,
ASSISTANT-SURGEON AND LECTURER ON ANATOMY.

Fractures of the fibula are of such common occurrence that it needs some apology to bring forward the subject, but I am induced to do so because the nature of the fracture in certain cases is peculiar, and has not, so far as I can discover, attracted notice. Most of the cases seen in the wards and casualty department of a hospital are simple, and the direction of the fracture either oblique or transverse through the substance of the bone, and the position affected is usually the lower fourth. Hamilton, in his work on fractures, gives 24 in which the fracture was in the lower third out of 36, and by the following table drawn up from my own observations when Surgical Registrar, the proportion of fractures in the lower third, not including the malleolus, is nearly 70 per cent., while if the malleolus be included it reaches 95 per cent.

From observations made during the years 1866 to 1868 on cases admitted into this hospital I find the following results:

	Total.	Sex.		Age.									Average stay.	Results.
		M.	F.	5.	10.	15.	20.	30.	40.	50.	60.	+		
													days.	
1866	22	18	4	...	1	2	2	8	4	3	1	1	22	All recovered.
1867	11	6	5	...	...	...	...	3	5	1	2	...	30	One died.
1868	31	27	4	1	2	2	1	9	8	7	...	1	21	Recovered
	64	51	13	1	3	4	3	20	17	11	3	2	23	

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Of this total of 64 2 were doubtful and of the remaining 62—

16 were fractures of the external malleolus,
43 were fractures above the malleolus, but in the lower third of the bone,
3 were fractures in the upper third.

62

12 were the result of direct violence, 52 of indirect violence.

In all except two (which form the subject of this paper) the fracture was simple and apparently not comminuted.

I have further examined the records of the cases of fracture of tibia and fibula, and I find in them no parallel instance to the two which are subjoined.

I find in none of the standard works to which I have able to refer any mention of cases in which the fracture was of the character found in the two cases here recorded. The peculiar feature of these cases was the existence of a vertical fracture of the fibula in its lower end, with a displacement of the fractured portion in such a way that it was twisted round on its long axis.

The cases were the following:

Case 1.—Henry W—, æt. 57, a whitesmith, was admitted into accident ward, under Mr. Simon's care, January 23rd, 1867, with an obscure fracture of the leg. He had slipped down on the previous evening in the frost, but in what position his foot was twisted he could not explain. He had limped home afterwards with a good deal of pain.

On admission it was found there was a projecting piece of bone standing up under the skin, between the ends of the tibia and fibula, close to the ankle, its size being about one and a half inches long, and rather more than half an inch wide. The tibia was traceable in its whole length to the inner malleolus, and the fibula in perfect continuity to the outer malleolus, but the latter had evidently lost considerably in breadth. Examining the other leg, it was found that the anterior edge of the fibula, close to the ankle, was thickened by gouty or rheumatic deposit, and by comparison it seemed most probable that a vertical fracture of the lower end of the fibula had taken place with displacement of the piece of bone, so that its point lay against the skin. The fragment was rather loose, but, never-

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theless, could not be replaced by careful manipula deformity remained. There was some swelling of joint from effusion, but this was not enough in itself a obscure the diagnosis.

The swelling soon increased, and with it there remained a tenderness over the displaced fragment, caused chiefly by pressure against the skin, and doubtless increased by t frequent attempts at manipulation. He was an irritable, cantankerous man, and by his struggles made examination and manipulation a rather difficult task.

On February 23, thirty-one days after admission, he was discharged at his own request, but the deformity was not improved. The piece of bone had united firmly in its new position, but the skin still remained acutely tender over it. The ankle-joint was rather limited in its movements, and he suffered pain of a marked character when he attempted to walk, so that the result of the case was rather unsatisfactory.

This case was one of the large number of accidents which occurred on the night of the 22nd of January, 1867, when a hard frost occurred immediately after and almost with a fall of rain, making the roads one sheet of ice. The nature of the injury was somewhat doubtful, but the diagnosis was as stated —*i.e.*, that it was a vertical fracture of the lower end of the fibula, with displacement. By one of those curious coincidences which occur contrary to all probability, an opportunity offered itself only a few weeks afterwards of verifying the accuracy of the diagnosis by the post-mortem examination of an apparently exactly similar case, the details of which form the subject of the following notes:

Case 2.—Wm. D—, æt. 55, a painter, was brought into the hospital March 9th, and placed under Mr. Simon's care. He had fallen while walking, but, being drunk at the time, could give no account of the position of his foot at the time of the accident.

The tibia was found to be fractured at the internal malleolus in a direction running downwards and backwards. The fibula was fractured transversely about two inches above the lower end. In addition to these, however, there was a piece of bone projecting beneath the skin between the tibia and the fibula.

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Of this was diminished in breadth considerably for the
16 were f inches of bone, and notwithstanding careful efforts
43 wer tion the deformity remained. It appeared that a
3 we fracture of the fibula existed with displacement of the
62 ated portion just as in the case previously reported. The
n was too drunk to take notice of what was being done for
m, or to give any evidence of pain during the manipulation of the fracture.

He was very noisy and troublesome, and did not sleep during the early part of the night. About midnight, therefore, half a drachm of tincture of opium was given, which gradually quieted him. He slept well from three a.m. to six a.m., and then woke up and conversed rationally with the other patients near him; about eight a.m. it was noticed that his breathing was heavy and rather laboured, and he soon became comatose and died at eleven a.m., or thirteen hours after admission.

At the post-mortem examination it was found that the nature of the fracture was as follows:—Besides the tranverse fracture, there was a piece of the fibula broken off longitudinally, and involving about one third the breadth of the bone. This was so shaped that the deeper portion of it ran to an angle, and this had become displaced on to the front of the tibia. It was, in fact, a vertical fracture of the fibula, with a twisting-round of the broken piece.

In addition to the fracture the other morbid appearances discovered were contraction, and commencing fatty degeneration of the kidneys, fatty liver, and slight congestion of the lungs. The heart was healthy, and its right side was full of decolorised clot as usual.

These two cases are valuable as showing a peculiar form of fracture in the fibula, in neither case reducible. It must be remarked, however, that after careful examination after death, when the surrounding tissues had been dissected away, the bone could be reduced by the following method:—The extreme lower end was firmly pressed, so as to elevate the receding central angle over the edge of the tibia, and as much rotation as possible was given to it. This angle being upon the ledge of tibia direct pressure backwards sent the whole into its original position. Whether this method might have been adopted with

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success during the life of the patient, or in the fir
case, admits of a certain degree of doubt, but it
guide for the method of attempting reduction in si
in future.

The sudden death of this man is peculiar, and the c
obscure. The chief disease found was a commencing
renal, and in such cases death does not infrequently happen
unaccountable suddenness.

In looking at these two cases it is curions that such a peculiar form of fracture should in each case have followed a twist of the foot, for there is no evidence to show that direct violence had anything to do with the injury. It is difficult to understand the modus operandi of the injury, but it is equally difficult in many cases of curious displacement of bones, or parts of bones, to follow the steps of the displacement.

The method of replacement found of service afterwards in the second case may be borne in mind, though it is quite possible that during life such an attempt might have proved futile, owing to the parts being locked and kept in their abnormal position by the tissues around. Still, the attempt would be worth trial in any similar case.

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16 were f.
43 wer tio
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PUERPERAL FEVER.

By HENRY GERVIS, M.D., F.R.C.P.

I PROPOSE in this paper to see if any light can be thrown on the etiology, course and treatment of puerperal fever, by a consideration of the details of the cases which have been published in the five annual volumes of the new series of these Reports. The cases are twenty-one in number. Of these sixteen died and five recovered. Many other slighter cases occurred during the period referred to, of which no details are recorded, but their general characters were similar to those of the more severe ones, differing only in degree, not in kind. The cases narrated were all well-marked cases of the malady termed puerperal fever. They occurred in the following order:—four in 1869; four in 1870; five in 1871; four in 1872; and four in 1873. Of the sixteen fatal cases, in ten the labours were natural; in four lingering, one being a breech case; and in two instrumental. Of the five cases which recovered, two were natural; one lingering; in one the hydrostatic dilators were used for rigidity of the os uteri; and in one the placenta was prævia. For the most part, but not always, they occurred in groups of two, three, or four. Where one case occurred, that is, it was rare for it to remain a solitary instance, but within a few days a second or even a third, and possibly more occurred, often in connection with the practice of the same attendant; and the spread of the malady was apparently only checked by rigid care in preventing any further attendance on other patients by any one who had been associated with an infective case. In the great majority of the cases the patients who

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suffered most severely were previously in ill-health, or in very destitute circumstances, or the subjects of mental depression from domestic anxieties. As an almost invariable rule the better the health at the time of attack the better the prospect of recovery. The date of access of noticeable symptoms was generally the third, more rarely the second day from the delivery, more rarely still the first. As a rule, the earlier the development of the symptoms the graver the case. In the majority of cases, if not in all, a rigor was the first expression of something being wrong, quickly followed by the general symptoms of feverishness, a quick pulse, a high temperature, restlessness, thirst and loss of appetite. Not in all cases did the patient complain of abdominal pain. Sometimes, indeed, its existence was only acknowledged when pressure on the abdomen was made; but in none was it absent when thus sought for; and in the majority from the beginning to the end it was the most prominent symptom. In situation and extent the pelvi-peritoneal inflammation thus indicated varied greatly. Sometimes it was limited apparently to the surface of the uterus; more frequently it affected also the surface of one or other broad ligament, and when of but one generally of the left; sometimes it involved the whole of the surface of the pelvic peritoneum, or would mount up in variable extent, uniformly or in patches over the whole of the abdominal peritoneum also. More or less parametric inflammation was also generally present. In slight amount it may often indeed be present, though not recognised because of the difficulty of detecting it when inconsiderable, without a careful bimanual examination; and much digital examination of the vagina is obviously undesirable. But in severer cases, where the inflammatory effusion separates considerably the folds of the broad ligaments, or involves the subperitoneal areolar tissue of one or other of the iliac fossæ, or rises above Poupart's ligament anteriorly between the abdominal wall and the peritoneum, it is sufficiently easy of detection. And our cases furnished illustrations of all these varieties of position. In the great majority of cases there was more or less enlargement of the uterus, due to congestion of its tissues, or to inflammation, or to œdema. As a rule, the higher the fundus uteri could be felt rising above the pubes the more serious was the prognosis. More or less inflammation of the vagina was a constant symptom.

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In several cases one or more excoriations or ulcers were present, and it may well be that they were oftener present than observed; when for instance, they were situated in the upper part of the vagina or on the cervix. Those noticed were usually about the vaginal entrance, or on the vaginal wall, and most frequently on the posterior vaginal wall, within a short distance of the fourchette. As a rule, they were superficial, with red edges, and covered by a thin layer of a pale yellowish colour, generally pretty closely adherent; sometimes they were sloughy, sometimes they were covered by a more or less thick exudation of a quasi-diphtheritic appearance. Sometimes there was inflammatory œdema of one or other labium, or of the entire vulva. In two or three cases partial sloughing of the vulva occurred. The lochial discharge was in almost every case offensive, in varying degree, at the outset; often, however, not to any very great extent. In the progress of the more severe cases it would generally become wholly suppressed; in the milder it would cease to be offensive under the use of intra-uterine injections, and would often recede and reappear in close relation with the well-doing of the patient. It was sometimes noted as containing shreddy flocculi, unconnected or in masses.

Obstructive phlebitis in connection with the veins of one or other of the lower extremities was not uncommon, and when affecting one leg only, generally the left, and affecting the left as a rule first even when both became subsequently involved. This was rarely an early symptom, and was therefore usually absent in those cases which ran rapidly to a fatal termination. Most commonly it occurred in the course of the second week. Not infrequently its occurrence in cases which previously had appeared hopeful proved the forerunner of death. Phlebitis affecting both extremities at the same time was always of grave omen.

In but three cases did distant abscess form; in one around the knee, in a case which ended fatally after some weeks' duration; in one, small subcutaneous abscesses occurred on the backs of the hands, in a case which did well; and in another fatal case there was suppuration of the right submaxillary gland.

In several cases patches of erythema occurred; sometimes at the elbows, sometimes on the wrists or shoulders; generally, in fact, in the neighbourhood of some joint. In a few cases ery-

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sipelatous swellings were noticed. They occurred in various situations, such as near one or other groin, on a leg, on a shoulder, or about the fingers; they were but rarely followed by suppuration, either passing away or remaining in much the same condition to the end. In a fewer cases still, large blebs filled with discoloured serum appeared on the legs; and in two or three, petechial spots appeared on the extremities or on the abdomen.

Suppression of milk took place generally, but not invariably. More or less diminution of the secretion occurred in the early febrile stage of nearly all the cases, and when symptoms of adynamia set in there would, as a rule, be suppression. But even in some of the most severe cases milk would occasionally be present in the breasts up to an advanced period.

In the great majority of cases vomiting was, at one stage or another, a prominent symptom. In some cases it was bilious; in others the stomach would constantly reject whatever nourishment was given; in others, again, and these for the most part were the worst cases, the matters rejected had the coffee-grounds appearance. Often apparently the sickness had a close relation with the extent of the peritonitis, occurring earliest in those cases where presumably the peritoneal inflammation reached soonest the hypochondriac and epigastric regions. In some of the cases which subsequently did well it was for a time distressing and intractable; in some of the worst and most rapidly fatal cases it might occur but once or twice and not again.

Tympanitic distension of the abdomen, occurring early, appeared also to have a close relation with the extent of the peritonitis, being most considerable where the peritonitis was most extensive, and least where the inflammation chiefly involved the pelvic viscera. When, on the other hand, meteorismus occurred late, it appeared to depend less upon the extent of the peritonitis than upon the amount of general adynamia. Whether early or late it was a symptom of serious import, and often by its interference with the action of the diaphragm a source of much distress to the patient.

Diarrhœa was of frequent occurrence, and the dejections were often for a longer or shorter period most offensive. Recovery, however, even after very offensive diarrhœa continuing for some days, was not uncommon.

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Pulmonary complications, bronchitis, pleurisy, pneumonia, more or less intermixed, were by no means rare. They generally occurred in the later stages of the malady, and often, when the abdominal symptoms had lessened and the case become more hopeful, they would turn the scale unfavorably.

Delirium, at first only towards evening, or through the night, and later on more or less continuously, occurred as a rule in all the more severe cases. When prominent, it would sometimes be of a muttering character; sometimes of a more excited type; occasionally accompanied with loud screaming at frequent intervals. Still in some of the fatal cases the mind would continue clear to the last, and in others only towards the last would the intellect become clouded, and the patient be with difficulty roused. In the slightest cases some rambling generally occurred during sleep. In some of the more lingering cases partial deafness and general bluntness of perception were prominent symptoms.

The temperatures recorded varied from 100°—103° in the less serious cases, to 104°—108° in the worst. Where a very high temperature was reached almost at the onset of the attack the prognosis was generally unfavorable; but nevertheless a very high temperature would sometimes be registered for many successive days, and yet the patient recover either wholly or in part; recover altogether, that is, or recover only to succumb eventually to some slowly developing phlebitis, or local suppuration, pelvic, arthritic, glandular, or otherwise. Fluctuations in temperature as the case progressed were not uncommon, and were apparently not always dependent on fluctuations in local inflammation. In most there was some evening elevation. In most there was a fall in temperature for a longer or shorter period prior to death.

Now, from this review of the symptoms of these twenty-one cases which have occurred in connection with one institution during five years can we come to any conclusion as to the essential nature of the disease called puerperal fever? Do the cases sufficiently resemble one another to entitle them to be placed in one category, or do they include a variety of different diseases classed under one head, simply because they happened to occur shortly after delivery in a puerperal woman? Can we draw a picture of a typical case of puerperal fever by which to test cases presented to us, alliance with which would justify us

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in speaking of the case so allied as one of puerperal fever, and non-alliance with which would justify us in considering it as possibly scarlatina in a puerperal woman, possibly typhoid, possibly icterus, but not as the disease known as puerperal fever? It appears to me quite possible. Indeed by putting together in their natural order the several symptoms we have been noting, the picture is made for us. A woman, very often previously in depressed health, is seized most usually about the third day after her delivery with shivering, followed soon by symptoms of sharp pyrexia, accompanied not infrequently by nausea and vomiting. With rare exceptions there is pelvi-abdominal pain, and tenderness more or less pronounced. Personally, I cannot recall one case either in hospital or consulting practice in which these symptoms were absent, and I use the words "with rare exceptions" in deference simply to the expressed opinions of other observers. The uterus, swollen as well as tender, rises, often many inches, above the pelvic brim, and examination of the iliac regions elicits, as a rule, indications of inflammatory swelling on one side or both. Passing then to an examination of the genital passage we find the vulva, vagina and cervix more or less hot, swollen and tender, and presenting frequently, if not always, one or more unhealthy excoriations, with inflamed edges. More or less offensive lochia, at least for a time, more or less diminution in the secretion of milk, and more or less tendency, sometimes extreme, to tympanitic distension, will complete the list of symptoms in which all cases share. Beyond these there are great varieties in their manifestation, according to the tissues or organs affected, either by absorptive transmission, by embolism, or by the spread of inflammation through continuous or adjacent structures. Thus, inflammation may spread from the uterine sinuses to the system of the internal iliac, and thence either extend downwards along the femoral vein, producing the symptoms of phlegmasia dolens, or upwards along the ovarian veins, or even the inferior cava itself, to a level with the kidney or still higher. And from these sources emboli may readily be carried to distant parts and prove centres of mischief in the lungs, the spleen, the kidneys, or elsewhere. Primary lymphangitis on the other hand is not so common as was at one time believed; and when it does occur, is usually due to the participation of the lymphatics in the inflammatory processes

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of the tissues in which they are situated. Pulmonary affections, independent of embolism, also by no means rare, may depend upon the intensity of the toxæmia, or arise by extension of peritoneal inflammation through the diaphragm. Peri- and endocarditis are not uncommon. Of local suppurations the varieties are many. There may be pelvic abscess in varying position, and of varying magnitude; labial abscess; abscess of ovary; suppuration in the course of veins, suppurative inflammation of joints, of glands, or, as occasionally happens, of the eyeball. Of skin inflammations there are also all varieties, from patches of evanescent erythema, to more or less decided erysipelas. And lastly, the nervous system is variously affected; there being sometimes slight and sometimes considerable delirium; and in the later stages one or more of the senses being in some cases dull, in others retaining their clearness to the end.

We have thus gone through the symptoms of the several cases of puerperal fever which have occurred in connection with our Charity, and from them sketched a picture of a typical case of the disease. We may now go a step further and ask, could it be by chance that in five successive years all the cases of puerperal trouble occurring in the practice of a large institution should be of the same type, and that not about one of them had we to ask, is it scarlatina? is it icterus? is it typhoid? but that without hesitation we could say of any one on seeing it, or even hearing the particulars of its symptoms, it is a case of that toxæmia called puerperal fever? My own feeling is certainly in favour of a negative reply. The resemblance between these cases cannot be one of chance. There must be some link in common between a series of cases of the same character differing only in severity, occurring year after year, and I believe this link to be found in the presence in all of a septic toxæmia. Puerperal fever, that is to say, I believe to be puerperal septicæmia, and to no other illness than this of the puerperal woman should I apply the name. A parturient woman may have scarlatina after her confinement, or typhoid, or jaundice; but if the train of symptoms we have been considering be absent, her illness will be scarlatina, typhoid, or jaundice, but not that toxæmia known historically as puerperal fever. From this stand-point the question of the origin and spread of puerperal

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fever becomes no longer difficult. If it originate in the presentation of septic material to some absorptive surface in the parturient woman, such as the site of recent placental attachment or some chance laceration of vulva, vagina, or cervix, to ascertain its source is to ascertain the source whence the septic material is derived.

Now, it has been recognised by many writers who do not recognise the septic element as the essential element in the origination of puerperal fever, that puerperal fever may be produced by causes generated within the patient, or by infection from without. And this same division agrees perfectly with the septic view. Septic material, that is, may be produced from within a patient, as by the decomposition of a retained blood-clot or portion of placenta, or the sloughing of a portion of vaginal or cervical tissue, or a dead fœtus; or it may be brought from extraneous sources either by direct transmission, as by the finger, by a syringe tube, or other instrument, or possibly by atmospheric convection. And these extraneous sources are very numerous. I need but mention the dissecting and the post-mortem rooms; any suppurating surface where decomposition of new growths is taking place; and the vaginal discharges of any other septicæmic patient. I can hardly, however, pass from this brief enumeration of possible sources of septic infection in the parturient woman without some reference to a cause considered by many excellent authorities as the most common of all,—I mean scarlatina. Where undoubted scarlatina without abdominal complication exists in a patient after delivery I see no reason to look upon it except as scarlatina. Where, with symptoms of scarlatina, symptoms of septicæmia are present, it would appear to me to be the one disease complicating the other, though both may probably have originated from the same patient. Where, on the other hand, puerperal fever, as it occurred in the cases forming the basis of this communication, appeared in a patient in whose family scarlatina was prevalent, but without in her there being any distinctive scarlatina symptoms, it is quite likely that the scarlatina in the house was the source of the sepsis, but I certainly should not speak of her disease as scarlatina. And scarlatina patients may easily from their throats, or nasal mucous membrane, furnish septic material sufficient to initiate septic changes in any

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absorbent surface with which it may be brought into contact. Were not the power of scarlatina to produce puerperal fever thus limited, it appears to me that attendance on midwifery by medical men in ordinary practice would be, from its danger, an impossibility. Among our cases there was but one in which any allusion is made to scarlatina as a possible cause. In that case the nurse, it is stated, had been in recent attendance on a scarlatina patient, but the puerperal patient presented no symptom which differentiated her attack from those in which no such supposed cause existed.

But will the presence of septicæmia account for all the various symptoms we have found to prevail in our cases of puerperal fever? I think so. Almost invariably, as we have seen, the earliest manifestation of puerperal fever occurs in connection with the uterine system, in the form of vaginitis, metritis, perimetritis, and parametritis more or less combined. And from the fact that the mucous membrane of the vagina, or the inner surface of the uterus is the starting-point of the malady, this is what one might expect. In a very small proportion of cases it is possible that the dose of poison absorbed is so considerable, the poison itself so intense, or the patient's capacity of resistance to infection so slight, that before there has been time for any but incipient inflammatory changes to occur in individual organs, not to be detected except by microscopical examination, the patient succumbs to a condition of blood incompatible with the maintenance of vital function. But, in the majority of cases, following upon septic absorption we have all varieties of local mischief from inflammatory œdema to acute necrosis of uterine and periuterine tissue. And either by extension of inflammation from tissue to tissue, or its local occurrence either from the influence of the toxæmia upon organs, or from embolism, every variety of glandular or serous inflammation met with, whether peritonitis, or pneumonia, or phlebitis, or pericarditis, may be readily understood. I know, indeed, of no symptom that occurs in cases of puerperal fever which septic infection will not explain. The next question that arises is, whether in puerperal septicæmia there is anything to distinguish it from the septicæmia of ordinary surgical practice. Of this latter, by personal experience I necessarily know but little; but still, from time to time, in connection, for instance, with operations on fibroids one comes

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in contact with the ordinary factors of septicæmia, necrosing tissue, and a recently incised absorbent surface. In a case, for example, recently in Adelaide, of a very large intra-uterine fibroid adherent to nearly the whole of the inner surface of the uterus, in which I could only accomplish its removal by the careful separation of adhesions at successive sittings, and cutting off portions by the galvanic wire, we had a case in which, on several occasions, a sloughy surface of many square inches' extent was for some time in close apposition with freshly lacerated and highly vascular tissue, for the hæmorrhage once or twice in breaking down the adhesions was considerable, and yet, although a certain amount of pelvi-peritonitis occurred after more than one of the stages of the operation, not once did any symptom of general septic infection occur and the woman made an excellent recovery. I could largely multiply this illustration, but I believe it is generally allowed that septicæmia in a surgical ward is not nearly so perilous and fatal a malady as septicæmia in connection with the puerperal condition. If any septic product is brought into relation with an absorbent surface in a puerperal woman there appears to be in her case a special risk of septic infection as compared with the non-puerperal patient, and if infection occur, septic symptoms are much graver. In this heightened predisposition both to infection and toxic development lies, I believe, the sole difference between puerperal and ordinary septicæmia. And this predisposition may be held to depend both upon local and constitutional conditions; local, in the absorbent surfaces offered constantly by the recent placental site, and frequently by the casual lacerations of the vagina and cervix to the influence of septic infection; and constitutional, in the condition of the blood and the condition of the nervous system. On these points I cannot do better than quote Dr. Richardson. He says, "A woman after delivery is physiologically in a peculiar position. Her blood is in a peculiar condition. The fibrine is sometimes in excess from three to six or seven and eight parts in a thousand; so that the blood is at this moment in a trembling equilibrium, ready on the slightest possible disturbance to precipitate it. Then there is a diminution of salts in the blood, again a condition favorable to the precipitation of fibrine. Then this woman has been for a time supplying to the child a mass of blood from her

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own body which has now stopped, so that, practically, she is in the condition of a person who has lost a limb, a considerable portion of the body. Then she is in a nervous condition; she has been supplying from her own potential energy that element which has been shown in the movement of the fœtus, and now that has stopped, and she is suffering from that nervous reaction which comes on when that motion is suddenly arrested; she is therefore in the exact condition for a series of changes which must necessarily be febrile in character." And this general predisposition, which exists in all puerperal women, may be again specially increased by whatever may still further affect prejudicially the constitution of her blood or depress her nervous energy. And indeed when sketching the features of our cases we noticed how specially apt were puerperal troubles to arise in those who were in previous ill health, or who had been the subjects of mental anxiety and depression. One additional consideration which favours the view that there is nothing specific in puerperal septicæmia is the occurrence now and again of cases of erysipelatous inflammation in an attendant, or in the infant of the woman infected, and even as I believe I have seen, in other non-puerperal patients (in connection, for example, with a slight surgical operation, as opening an abscess) through the medium of the medical practitioner.

Lastly, as regards the treatment. Believing the vaginal or uterine surface to be the starting-point of the malady, and that the sooner any septic material brought there or produced there can be neutralised, the less severe is the attack likely to be; on the first indications of mischief treatment is commenced by free and repeated intra-uterine injections of warm water with the permanganate solution added. The result is often a speedy improvement, local tenderness being diminished, and high temperature lowered within a short space. But if in spite of the injection, or before it is commenced, pelvic inflammation be established, it is mainly attacked by the application of turpentine at regular intervals to the lower abdomen, and in the intervals poulticing. Occasionally we have used blisters to one or other inguinal region and with advantage. As regards internal medicines, I trust mainly to the combination of opium and carbolic acid in the form of pill, with quinine in large doses in mixture. The carbolic acid I have given partly from the

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hope that by its antiseptic properties it may do good, and partly from the certainty that in the way of allaying sickness and relieving flatulence it has a distinctly beneficial effect. Recently we have had a case of puerperal septicæmia in Adelaide in which we have administered carbolic acid by subcutaneous injection, the experience of the surgical wards having been in favour of its use in this way promoting a fall of temperature, but one case has not been sufficient to establish its utility. Beyond these measures the treatment must vary with the circumstances of the case. If there is diarrhœa present with more or less offensive motions, believing this to be one channel by which elimination of septic poison may take place, I generally moderate it by bismuth and aromatics, rather than endeavour wholly to check it by more powerful astringents. Pulmonary symptoms are treated on ordinary principles. Nourishment and stimulants are administered according to the exigencies of the case. The precautionary treatment is not the least important. Although not believing puerperal fever, so called, to be a specific fever capable of transmission except through the actual transfer of septic products, I have seen too many instances of the kind to doubt that the medical attendant may be the involuntary agent in so transferring it. Whenever, therefore, a medical man is in attendance on a woman suffering from puerperal fever, and it devolves upon him to use the uterine douche or in any way bring his fingers in contact with the secretions of her genital passage, he runs considerable risk of transferring septic poison to any other patient he may attend. And conversely, any medical man who has to dress an erysipelatous or sloughy wound, or come in close contact with cadaveric poison or other source of sepsis runs some risk, without at all events the greatest care, of inducing septicæmia in any lying-in woman he may attend, if by chance she present any absorbent surface accessible to the poison. As to how long a medical man who has become infective may so continue it is most difficult to decide. I have known it continue in the case of medical friends until the hope of ever being otherwise was well nigh despaired of, in spite of all kinds of baths and ablutions; but were my advice asked under similar circumstances now, I should certainly recommend the plan of disinfection by iodine suggested by Dr. Wynn Williams.

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SOME THOUGHTS ON THE

UTILIZATION OF THE MEDICAL SCHOOLS OF LONDON,

IN ANY SCHEMES

CONNECTED WITH UNIVERSITY EXTENSION AND SECONDARY EDUCATION.

By ALBERT J. BERNAYS.

Nothing has struck me more forcibly in all the talk about education, and the need of connecting links between primary and secondary education, than the disuse or non-usage of so many existing institutions.

I would wish to illustrate my meaning by calling attention to the opportunities for instruction which the medical schools of the various hospitals could supply. We will assume that the authorities would give their permission, as they would also share in the pecuniary advantages.

There is to be found in every such establishment a staff of teachers who might be employed with great advantage in the proposed scheme of university extension. According to modern notions, no gentleman can be considered educated who was without some knowledge of Physiology, and I do not think it possible for any one to receive instruction in this science to greater advantage than he could obtain it at a medical school. It is possible that the recognized teacher might not be inclined to give such lectures himself, but he is acquainted with several

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young men of great ability who would be only too glad, under his guidance, to perform the office. There are, at every medical school, a number of able young men who are completing their education, who would delight to spend another year or so in attending the hospitals, if they could only find the means. During the medical session of nine months it would be easy to find both the men, and the time, to teach physiology both practically and theoretically. Teachers of the upper classes of board-schools might, by arrangement with the Committee of the Board School of London, obtain the means of acquiring sufficient knowledge so as to be enabled to impart instruction at their respective schools. A small payment for each teacher, say sixpence per lecture, with a guarantee of £5 5s. a lecture to the professor, would give such a stimulus to scientific teaching as can never be obtained with the aid of South Kensington. The medical schools being distributed over London would furnish convenient centres for large districts. There would be no necessity for building laboratories either for the study of Chemistry or of Chemistry applied to Physiology: all the appliances for practical work are ready to hand. Instead of a system of centralization, which threatens to overthrow some of our most essentially English ideas, we should have colleges sufficiently widely apart to be convenient to the respective inhabitants of the neighbourhood: unity of plan, with diversity of management.

I would especially ask that, in any scheme for university extension, the claims of the teachers in the medical schools should not be ignored. Anatomy, botany, chemistry, and physiology could be taught both at the schools, or if desired, elsewhere. But it does seem a waste of means that the museums, lecture-rooms, and laboratories, should be so little employed compared with their capabilities.

There has been much talk about scientific education, and we have had a Royal Commission of inquiry. I doubt not myself that many thousands of pounds will be wasted in new buildings, new teachers, &c., instead of subsidizing those already in existence, and turning them to profitable account.

Probably I shall be reminded of the evening classes of King's College, and those of London University College; I have not forgotten their existence; their very success is in favour of

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utilising the latent powers of the medical schools, especially in the evenings, and in a part of the vacations.

I do not wish to exhaust the subject, or to waste space by diluting over much what I have to say. I have said it without taking counsel of any one, and without any authority beyond what is possessed by one, who has done as much in teaching chemistry as any one in England.

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ON AN

OSTEOPLASTIC OPERATION

FOR REMOVING

NASO-PHARYNGEAL GROWTHS.

By WILLIAM MAC CORMAC, F.R.C.S.,
SURGEON TO AND LECTURER ON SURGERY AT ST. THOMAS'S HOSPITAL.

Tumours filling the nasal cavity, projecting forward at the nostril, and backward behind the soft palate into the upper part of the pharynx, are often difficult to remove. Several more or less severe operations have been devised for the purpose. I am not aware if the one I am about to describe have often been performed, in this country at least, and, as in the case in which I employed it the objects sought for were attained, I venture to give the particulars of the operation and the result.

A girl of twenty-two years came into hospital in July, 1874, with both nostrils completely filled and distended with a polypus growth, projecting at the anterior nares, and visible in the mouth behind the velum palati. The tumour on each side appeared to be firm, and of a fibro-gelatinous structure, whether felt in front or from behind, and suggested the idea that it was a single growth. It was first noticed five years before, and although four different times an operation had been performed for its removal, only very temporary relief was experienced, the disease always becoming more and more extensive, widening out the nasal bones and cartilages, until the face presented the hideous appearance represented in the woodcut (Fig. 1), which is copied from a photograph.

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The young woman was most desirous to submit to anything likely to afford her a prospect of cure, and as I did not think any

FIG. 1.

further repetition of the use of the forceps likely to benefit her, under the circumstances, I decided to perform a modification of an operation suggested by Von Bruns, and before him, I believe, by Chassaignac, by which I hoped to fully expose the nasal cavity, and destroy the base whence the growth sprang, operating on one side at a time.

An incision through the soft parts down to the bone was therefore made in the line indicated in the diagram, Fig. 2, commencing above, over the bridge of the nose, and running obliquely downward and outward, then horizontally beneath the ala, in the inner part of which it was made to terminate. A keyhole saw was now inserted, and keeping the point directed towards the nostril, the nasal process of the superior maxillary bone, and the nasal bone itself, were cut through in the line of the superficial wound. The flap thus formed of bone and of the soft parts could now quite readily, and with the exercise of very little force, be turned up towards the median line, just like the lid of a box, and the nasal fossa came fully into view, the undivided portions of the nasal bones yielding by fracture at their junction with one another.

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The growth proved to be of a villous character, resembling a papilloma, and was difficult and tedious to remove, the bleeding being copious. The actual cautery was freely used to check hæmorrhage, and cauterise the attachments of the growth, the

FIG. 2.

whole cavity being completely under supervision and control. After the operation was completed, and the bleeding arrested, the flap was pressed back into its place, the cut edges of the bone coming accurately together; and as they were sawn through obliquely, there was no tendency for the flap to fall inwards. The soft parts were now sutured with silver wire, and a pad of wet lint laid on the surface. The external wound healed by first intention, and the bone also quickly united.

After an interval of three weeks, an operation precisely similar was performed on the other side with an equally satisfactory result, and the patient soon after left the hospital. Although the aim of the operation was not to remove the deformity, this result was to a considerable degree obtained (and it is evident that the operation in itself need cause very little), as the accompanying woodcut, Fig. 3, shows.

It was drawn from a photograph taken some six months after the girl went home, and it shows very well the diminished breadth of the nose. She can breathe quite freely, and hear

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much better than she did. The scar of the wound is scarcely noticeable, and in some parts quite invisible.

Recently she returned to hospital with symptoms of nasal obstruction, and I feared a return of the disease, but was pleased to find only the ordinary mucous polypus, which I

FIG. 3.

removed with forceps, twisting it off in the usual way. The sensation in all parts of the nose is completely restored.

There need be no apprehension of an inadequate supply of blood to the flap, as the free anastomoses with the vessels on the uninjured side will provide against this. It is necessary to avoid making the incision too close to the lachrymal sac, as if this be injured a fistula will be the probable result.

It is desirable, too, that the incision should be made, not from the outer extremity of the nostril, but as shown in the cut, for in this way the size and form of the aperture will be better preserved.

The operation is not difficult to perform, is followed by a minimum of deformity, and was in the present instance so rapidly and readily recovered from, that I do not hesitate to recommend it for those cases in which it is desirable to obtain a very complete access to the nasal cavity.

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CYSTIC AND DERMOID TUMOURS OF THE EYE.

By S. OSBORN,
SURGICAL REGISTRAR.

It appears somewhat like a work of supererogation to attempt to say anything more upon cysts of the iris, since the subject has been already so thoroughly treated by Mr. Hulke in a monograph published in the 'Royal London Ophthalmic Hospital Reports' of 1869. But it has occurred to me that the origin of this disease may, in certain cases, bear a different explanation from what has hitherto been given. My object in this paper is to inquire whether cysts may not occasionally be due to a dilatation of some portion of the obliterated remains of the ocular cleft. Dermoid tumours in like manner, I believe, take origin from the same. I have endeavoured to substantiate in the following details my reasons for these opinions.

Firstly, as regards the situation of the ocular cleft, and its imperfect closure, called coloboma; then as to the structure, situation, time of appearance, and cause of these tumours.

In the development of the eye it will be remembered that an invagination of the cuticle takes place, firstly, into the primary optic vesicle, and becoming shut off forms the lens; and again, subsequently, another invagination of the cuticle takes place from below upwards to form the secondary optic vesicle, the root or neck of the invaginated portion gradually becoming shut off from above downwards by the gradual occlusion of this

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canal, to which the term of ocular cleft is given. Should any portion of this ocular cleft remain open after birth, the term coloboma, meaning a curtailment, is applied to it, and varieties are found according to the amount of tissue affected. Thus, we have coloboma of the choroid and coloboma of the iris, the former of which may exist in conjunction with the latter, or either may occur separately.

It is more especially to the latter, having reference to the present subject, that I would draw attention.

Coloboma iridis, or congenital deficiency of a portion of the iris, due to the imperfect closure of the ocular cleft, consists of a gap in the lower, or lower and inner part of the iris, more or less triangular in shape, with the base of the triangle situated at the pupillary margin, and the apex at the sclero-corneal junction. It usually affects both eyes, and in a case lately under Mr. Wagstaffe, a true cleft was visible in the right eye, and in the left the coloboma was closed by an imperfectly pigmented membrane, or what looked like a deficiency of pigment over a triangular area corresponding to the coloboma in the opposite eye. The choroid was in no way affected, nor was there any congenital malformation of any other part of the body.

The rarity of these cases and the absence of any representation of such a malformation, as far as I am aware of, renders a sketch of this case worthy of insertion.

Cysts of the iris appear like small white currants, semi-

Coloboma iridis, from the case of J. M—, æt. 4; there being a complete fissure in the right iris, and in the left an imperfection of pigmentation over a corresponding area.

transparent and pearly, reflecting the colour of the iris on or in which they arise; gradually protruding themselves more and

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more anteriorly, because there is less resistance than posteriorly; and projecting into the anterior chamber overlap the pupillary margin, and sooner or later produce an attack of iritis. Some difficulty may be experienced in diagnosing them from hydatids, but the presence of a definite base of attachment is diagnostic. Comparison of the two may be made by reference to Plate V of Mr. Wharton Jones's work on 'Ophthalmic Medicine and Surgery,' where a diagram is given of both diseases.

In structure, Mr. Hulke describes one of these cysts as consisting "of a delicate homogeneous cell-wall, varying from $\frac{1}{1300}$" to $\frac{1}{8600}$" in thickness. Its outer surface was overlaid by a network of fusiform cells, identical with those of the contractile tissue of the iris; and its inner surface was lined by a pavement epithelium, the cells of which differed much in size in different parts of the cyst;" and as regards position of origin, the same author classifies them as—(1) those originating in the iris, and which lie between the uveal and the muscular stratum of the iris; and (2) those originating in connection with the ciliary processes, and which lie behind the iris, and bear the uveal as well as the muscular strata in their front. Usually they possesss serous contents, but as the epithelial lining is liable to further development, so may the cyst consist of almost solid contents, as in the case quoted by Mr. White Cooper, in the 'London Journal of Medicine' of 1852, p. 789, where the cyst appeared to be made up of epithelial cells closely agglutinated together; or the cyst may consist of true skin, fat, hairs, and sebaceous follicles, due to the perverted growth of the epithelium of the cyst-wall. A rapid increase or preponderance of fat in these cysts has caused some authors to place them under the head of lipomata.

In the 'Dublin Quarterly Journal,' of May, 1871, p. 295, Mr. Swanzy mentions a very interesting dermoid tumour, of which a diagram is given, which occurred under Professor Von Graefe. This tumour appeared to consist of a pouching of the skin outwards, and was made up of an external cutis-like layer, in which was found, as on the external surface of the body, hair follicles, with a few fine pigmentless hairs and sudoriferous glands, which extended into the layer of fatty tissue lying beneath, differing in no way from the usual subcutaneous fat, and of which the greater part of the tumour consisted. This

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tumour did not take origin from the ocular cleft, but from the first invagination of the cuticle which was described as taking place to form the lens, which was absent in this instance. Here, instead of an invagination taking place to form the lens, the portion of skin, instead of being folded inwards, had been folded outwards and formed the tumour above described. Now, it is allowed that none of the elementary tissues constituting cysts of this character are normally present in the iris or on the eye-ball, therefore they must be regarded either as new formations, or, as is more probable, dilatations or outgrowths from the epithelial sheath invaginated into the eye in the process of development.

Concerning the situation of the cysts in the recorded cases, it is difficult to make any accurate observations, the exact point of attachment not being in all cases mentioned; but in those that are, the preference is given to an inner or lower portion of the iris.

With dermoid tumours, however, the situation is more defined, that being at the sclero-corneal junction along its lower margin. A very interesting case is quoted in the 'Ophthalmic Hospital Reports,' vol. vii, p. 245, where, in addition to a dermoid tumour, developed, I believe, in the ocular cleft, was another dermoid tumour on the same level in front of the ear, a little above the tragus, due to the formation of a cyst, apparently in the same manner. This was in the first branchial cleft between the superior maxillary process of the first visceral arch and the anterior cerebral vesicle.

As to the date of appearance of cystic and dermoid tumours no specific time can be mentioned; either of them may be congenital, the dermoid perhaps more frequently so, or either may be developed later in life, and gradually augment considerably in size.

The probable commencement of a cystic and congenital tumour is, I think, seen in a case quoted by Mr. White Cooper, at p. 792 of the 'London Journal of Medicine,' 1852, where in a congenital gap of the bright hazel fibres of the iris, was a small tumour, which he describes as being a hernia of the uvea. The occasional presence, therefore, of a fissure of the iris after the cure of such cysts, as in the case quoted as belonging to the late Mr. Dalrymple, is in favour of there having been primarily a fissure or congenital malformation of the eye, as in

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the preceding case, and the cyst being a dilatation or outgrowth of some portion of it.

One other case I would bring forward, viz. one published in the 'Lancet' of 1852, p. 569, where inflammation set in as the result of puncturing the cyst, and as a consequence "the matter of the cyst worked its way outwards at the junction of the cornea and sclerotica by a narrow passage." Now, if such a cyst was growing from some dilated or unobliterated portion of the ocular cleft, no more likely channel for the exit of its contents could be found than the expansion of that prolongation of which the cyst is presumably a dilatation, and which would be also affected by a like inflammatory process.

As to the cause, the majority of cystic tumours of the eye are doubtless attributable to some punctured wound, although some period may have elapsed between the receipt of the injury and the first appearance of the tumour; but, on the other hand, some arise to which injury cannot be assigned as a cause; and some have such a cause attributed to them unjustly, patients being only too ready to attribute to any tumour a history of a former injury.

But dermoid tumours are almost always congenital, although they may be developed at a later period of life and increase gradually in size. To dermoid cysts, injury is seldom assigned as a cause; but why is it more commonly assigned in cystic tumours? the internal lining of pavement epithelium is equally foreign to the normal constituents of the eye.

Mr. Bowman attributes these cysts to a morbid formation of transparent fluid between the iris and its posterior epithelium, commonly called the uvea, the cyst appearing first as a bulging of a portion of the iris towards the cornea, the fibres of the iris slowly yielding. This has, however, been proved not to be always the case, as the uvea is sometimes found to form part of the anterior wall of the cyst, and the presence of congenital tumours where no injury is assignable makes it probable that the cause is a dilatation or outgrowth of some portion of the ocular cleft.

Finally, the identity in the situation of these tumours with the position of the ocular cleft, and the fact of the structure of the cysts differing from the normal constituents of the eye, are further arguments in favour of the view here advanced.

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ANATOMICAL VARIATIONS.

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Among the many anatomical variations which we have observed while demonstrating anatomy in the dissecting room of St. Thomas's Hospital, the following seem to us the most interesting and worthy of record.

These have occurred during the last six years, in the course of which time about one hundred and fifty bodies have been dissected, and notes taken of any abnormality that has been noticed, although it is obvious that a certain number must, from circumstances, have escaped observation.

For convenience of description, they may be grouped in the following order:

1. Variations in Muscles.

Two cases showing a peculiar arrangement in the fibres of the external pterygoid muscle.

The two following cases, showing a peculiar arrangement in the fibres of the external pterygoid muscle, were observed:

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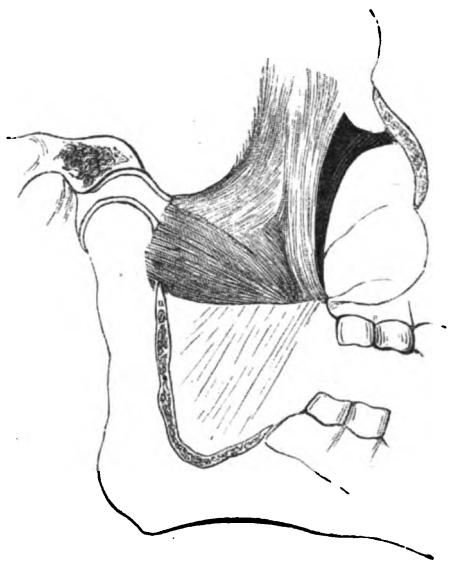
Case 1.—Upon the outer surface of the right external pterygoid muscle, close to its origin from the margin of the sphenomaxillary fossa, a number of vertical aponeurotic fibres were connected above with the pterygoid ridge of the sphenoid along its anterior part, and ended below in well-defined muscular bundles. The muscular bundles were found to be attached below to the lower part of the outer surface of the external pterygoid plate. These superficial vertical fibres of the external

Fig. 1.



Case 1.

Showing the vertical tendinous fibres of the external pterygoid, from the under surface of which a portion of the horizontal muscular fibres sprang. The band of vertical fibres is about half an inch broad. For the lower fourth of their length they usually became muscular.

pterygoid consequently ran a short distance from bone to bone without a possibility of movement of either extremity. It therefore became a matter for conjecture as to what function they could possess, and the further connections of this structure were carefully examined. At the anterior border of the muscle it was seen that the usual origin from the tuberosity of the upper maxilla and palate-bone was entirely deficient, and with this,

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and probably accounting in a measure for it, there was a rather larger spheno-maxillary fossa than is commonly observed. The most posterior of the superficial aponeurotic fibres gradually blended with the rest of the muscle in the manner shown in the accompanying sketch, and the uppermost of these passed directly into the anterior surface of the inter-articular fibro-cartilage of the joint. Upon turning back the vertical aponeurotic fibres it could then be seen that from their under surface started a large number of the ordinary horizontal fibres of the muscle.

Here then seemed to be the explanation of what appeared an anomaly. These vertical fibres, half tendinous, half muscular, running between two fixed points of bone, formed a start-point for other muscular fibres at right angles to them. The use of the muscular portion of these vertical fibres seemed to be to render tense the tendinous portion at exactly the same time as strain was exerted upon it by the contraction of the horizontal fibres rising from it.

The subject from whom this was taken was certainly not well developed muscularly in other parts, and here the fibres were soft and fatty.

Case 2.—This was very similar to the first case. A band of aponeurotic fibres (about ½ inch broad) ran vertically downwards upon the outer surface of the right external pterygoid close behind the superior maxilla. These fibres were attached above to the pterygoid ridge in its whole length, below they became muscular, but the development of muscle in connection with their lower ends was not so well seen as in the previous case. The anterior fibres ended below by being inserted into the outer surface of the external pterygoid plate. The posterior ended by joining some of the fibres of the internal pterygoid. From the under surface of the anterior fibres sprang the ordinary horizontal fibres of the external pterygoid, as in Case 1, but the posterior fibres passed freely over the external and joined the internal pterygoid. The attachment of the external pterygoid to the back of the superior maxilla and palate-bone was in this case also deficient, but the spheno-maxillary fossa not so large as in the previous case. No similar structure existed on the other side, but the origin of the muscle was normal.

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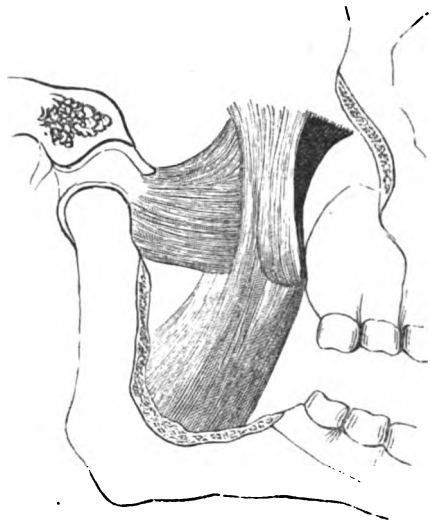
In each of these cases a peculiar musculo-tendinous structure was present upon the surface of the external pterygoid; in each this structure was mainly composed of tendinous fibres, but

FIG. 2.



CASE 2.

Vertical band of fibres on surface of external pterygoid, about half an inch broad, the upper three quarters usually tendinous, lower quarter muscular and attached to lower part of external pterygoid plate, the most posterior fibres running into the internal pterygoid. Horizontal fibres of external pterygoid rise from the under surface of the anterior fibres of the band.

muscular tissue was found in its lower portion; in each the structure was placed at right angles to the direction of the fibres of the muscle upon which it was lying; in each the ordinary horizontal fibres of the muscle took origin from its under surface; and in each these horizontal fibres had not their usual attachment to the back of the superior maxillary and palate-bones. The result obtained by this peculiar structure in each case was the same; the tendinous portion gave origin to the superficial fibres of the external pterygoid, while the muscular portion rendered the former tense at the time they were being pulled upon by the fibres rising at right angles from them.

It would be interesting to observe how far such an arrange-

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ment of superficial aponeurosis exists in the external pterygoid of animals, and particularly in those animals in whom the spheno-maxillary fossa is proportionally larger than in man.

These two cases have been recorded in the 'Journal of Anatomy and Physiology,' vol. v.

Accessory slip to the sterno-mastoid muscle from the angle of the lower jaw.

On the left side of the head and neck of a fairly developed male subject the sterno-mastoid muscle received a slip from the angle of the lower jaw. The slip, of the thickness of the little finger, one inch and a half long, was attached above by tendon to the angle of the jaw, posterior to the insertion of the masseter muscle. It passed downwards and backwards, superficial to the external carotid artery, underneath the external jugular vein, and blended below with the anterior border of the sterno-mastoid. It was enclosed in a distinct sheath of cervical fascia, which became continuous with that of the sterno-mastoid.

The omohyoid muscle arising from the clavicle.

The omohyoid muscle, on the left side of an average muscular male subject, arose by strong fleshy fibres from the upper border and posterior surface of the middle third of the clavicle, and also by a very small tendon, of the size of an ordinary surgical probe, from the superior border of the scapula internal to the supra-scapular notch. The muscle entirely concealed the third part of the subclavian artery. The external jugular vein dipped underneath its upper border to join the subclavian.

On the right side the muscle was quite normal.

Three cases of abnormal mode of insertion of pectoralis major, and latissimus dorsi.

Among the many abnormalities which we have noticed with regard to the insertions of these muscles, the following seem especially interesting:

In both axillæ of a muscular male subject a strong slip of muscle (1, in accompanying sketch, Fig. 3) arose from the outer surfaces of the bony portions of the fifth and sixth ribs, from the fascia between them, and from the upper one inch and a half of the front

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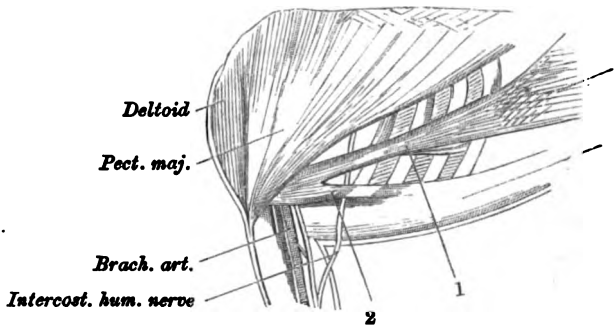
of the sheath of the rectus muscle. It was separated at its origin by an interval of about one inch from the lower border of the

FIG. 3.



pectoralis major. Also in the posterior wall of the same axilla a fleshy fasciculus of muscle (*2*), the size of the forefinger, and three inches and a half long, came from a tendinous intersection in the latissimus dorsi, near the inferior angle of the scapula. Both these slips converged outwards, and passed over the axillary vessels and nerves to blend with one another, and were inserted into the posterior plane of fibres of the insertion of the pectoralis major. Through the tendinous intersection in the latissimus dorsi the intercosto-humeral nerve passed.

A very muscular male body had on both sides of the body the slip, derived from the latissimus dorsi, arising from the outer surface of the seventh rib, passing forwards and outwards to be inserted into a broad fascia stretching between the lower border of the pectoralis minor and posterior surface of the third plane of insertion of pectoralis major.

In another case, those fibres of the pectoralis major which arise from the cartilage of the sixth rib, passed upwards underneath the rest of the muscle to be inserted into a similar fascia.

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Six cases of rectus sternalis muscle.

This muscle we have observed occurring in six subjects. In three it existed on the right side only, in two on both sides, and in one it lay for the most part on the left side, part of its course being in the middle line.

Case 1.—In a fairly developed female subject the sternalis muscle, about five inches long, was attached for about one inch vertically by tendon to the right of the middle line of the front of the sternum, just below the interclavicular notch. It passed downwards for two inches, being tendinous and spreading. In the next two inches of its course it was fleshy and still increased in breadth, and finally was attached by aponeurotic fibres to the upper and inner end of the sixth costal cartilage, and to the front of the sheath of the rectus along the line of the same cartilage. At the lower attachment the aponeurotic fibres were joined by a slip from the external oblique muscle, which was quite separate from the rest of that muscle, and arose from the fore part of the outer surface of the fifth rib.

Case 2.—In this case the muscle had very much the same attachments as the former. It was, however, more fully developed, but received no slip from the external oblique muscle.

Case 3.—The muscle here was not so large as in the above two, and its exact attachments could not be noted as its limits had been destroyed in opening the thorax for injection.

Case 4.—In a very muscular male subject the sternalis muscle was present on both sides, the right one being larger than the left. On the right side it was six inches long, and arose by tendon two inches and a half long and half an inch broad from the front of the sternum, blending with the tendinous origin of the sterno-mastoid. Below it was attached to the front of the cartilages of the third, fourth, and fifth ribs, and by fleshy and aponeurotic fibres to the front of the sheath of the rectus. The general shape of the muscle was triangular, the broadest part of it being on a line with the fifth costal cartilage, and measuring one inch and a half. On the left side the muscle had similar attachments, but was not so fully developed.

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Case 5.—In this case the muscle was present on both sides of a male subject, but no particular notes were taken of its limits.

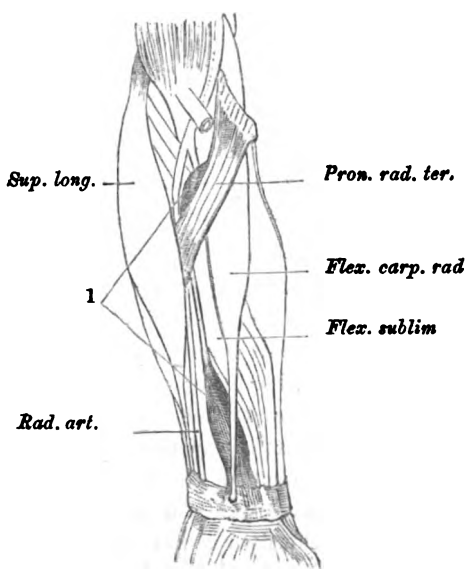
Case 6.—Here the sternalis was peculiar in lying partly in the middle line, and partly on the left side. The muscle, five inches long, was attached above by tendinous fibres to the front of the sternum opposite the first and second ribs, and below the cartilage of the fifth rib, sending aponeurotic fibres to blend with the sheath of the rectus. The upper two inches of the muscle were tendinous and lay over the middle of the sternum; the lower three inches were mainly muscular but partly aponeurotic, and passed to the left side. The greatest width of the muscle was three quarters of an inch, about opposite the interval between the third and fourth ribs.

No corresponding muscle existed on the right side.

Abnormal palmaris longus muscle.

In the right forearm of an averagely developed subject, the pal-

Fig 4.



maris longus (1, in accompanying sketch, Fig. 4) arose by fleshy

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fibres, two inches long and half an inch thick, from the upper part of the inner aspect of the coronoid process of the ulna. It then passed downwards and inwards, lying upon and embedded in the anterior surface of the flexor sublimis digitorum, was traced as a small tendon underneath the pronator radii teres, and then had a second fleshy belly of the same size as the upper one, which was crossed by the tendon of the flex. carp. rad., and was inserted into the anterior annular ligament, and palmar fascia.

The position of this muscle is peculiar, inasmuch as it lies deeply, and also in its making a curve with the convexity directed outwards, so that when it acted it would tend to draw inwards the superficial structures on the outer side of the forearm.

Partial deficiency of the tendon of the long flexor of the thumb.

During the usual demonstrations, attention was called to what was thought to be a case of deficiency of the long flexor tendon of the thumb (left), and upon careful examination the following condition of parts was found. A muscle (T, Fig. 5) occupying the usual position of the flexor longus pollicis arose from the radius and interosseous membrane, and its tendon passed downwards in its usual position under the anterior annular ligament and the superficial flexor tendons. Instead, however, of passing between the two heads of the flexor brevis to the thumb, the chief part of the tendon (1) joined the index tendon of the flexor profundus digitorum (Fl. p.): a second portion (2) spread out upon the carpus and attached itself to the ligaments covering the carpal bones in front; and a third part (3) left the tendon rather higher up, and was inserted by a well-defined triangular expansion into the outer surface of the outer or superficial head of the flexor brevis pollicis.

On the thumb itself a well-marked tendon (ST) lay on the palmar surface of the first and second phalanges in the position usually occupied by the digital portion of the flexor longus pollicis tendon. This peculiar tendon was attached by two

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distinct slips to the head of the so-called metacarpal bone of the thumb. These two slips were connected one with each side of the head of the bone. From these proximal attachments it passed forwards, lying free upon the first phalanx, and was slightly spread out to be inserted as usual into the base of the ungual phalanx. A reflected portion representing the ligamentum breve (L. b.) was connected as usual with the capsule of the neighbouring joint and the head of the proximal phalanx.

The nerves were also peculiar in the thumb. Two digital branches as usual came from the median, but about an inch from their origin they each presented enlargements—on the outer nerve two, on the inner one—in size about equal to a millet seed. Beyond these enlargements the outer nerve could be traced onwards to its ordinary distribution, but the inner nerve appeared atrophied and was lost in fibrous tissue opposite the middle of the first phalanx.

The arteries were smaller than usual.

In this case, therefore, we have a muscle arising like the flexor longus pollicis, but inserted into the deep flexor tendon to the index finger, and connected also with the fibrous structures about the wrist; we have a tendon resembling that of the flexor longus pollicis, but only stretching between the head of the metacarpal bone and the ungual phalanx; and associated with these muscular peculiarities about the thumb we have peculiarities in the appearance of the digital nerves and vessels.

That these peculiarities were developmental appeared beyond doubt, for there was no evidence either in the existence of scar, or in the matting together of neighbouring tissues, that mechanical injury or disease had been the cause. It would seem that an error of development had occurred; that from some cause the intermediate portion had not been developed; that consequent upon this the free ends had attached themselves to neighbouring parts—one to the head of the metacarpel bone, the other to the deep flexor tendon for the index finger and the carpus. And the condition of the digital nerves and vessels would agree with, although it would not necessarily require, the supposition that these peculiarities were the result of faulty development.

It may be asked what movement was obtained in the thumb.

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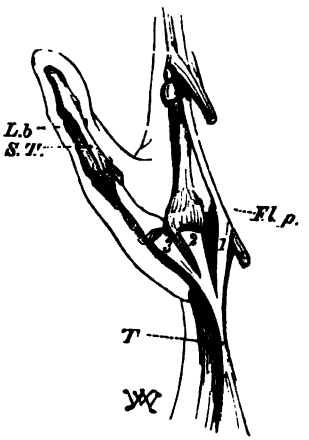
No flexion of the ungual phalanx was obtained by traction upon muscles The ordinary movements of the proximal phalanx

Fig. 5.



were obtained. Traction upon the muscle which occupied the place of the flexor longus pollicis produced flexon of the index finger, with some flexion of the wrist. It did not seem that any means were provided for flexion of the tip of the thumb by connection between the flexor brevis and the tips of tendon lying alongside its insertion. It must be concluded, therefore, that the ungual phalanx of that thumb in this case was not capable of movement at the will of its owner.

This abnormality has been recorded in the 'Journal of Anat. and Phys.,' vol. vi.

Variations in the flexor carpi radialis and flexor sublimis digitorum muscles.

In one case the flexor carpi radialis had a second head arising from the coronoid process, on the inner side of the pronator radii teres, and a third head from the whole length of the oblique line of the radius. The median nerve passed through between the two heads of the flexor carpi radialis after passing between the two heads of the pronator radii teres.

In the right forearm of a male subject a special flexor carpi

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radialis arose from 1½ in. of radius and interosseous membrane, between the flexor longus pollicis and pronator quadratus. It passed down outside the flexor longus pollicis and the ordinary flexor carpi radialis, over the annular ligament, to be inserted into the tuberosity of the scaphoid and ridge on the trapezium. At the wrist-joint the radial artery lay between it and the supinator longus. The muscle was 4 in. long, ¾ in. broad at its widest part, and was fleshy to within ½ in. of its insertion.

In another case the *flexor sublimis digitorum* had no connection with the radius, but had a distinct attachment to the front of the anterior ligament of the elbow-joint and orbicular ligament of the radius.

Special flexor of little finger.

In five cases a special flexor of the little finger has been observed. In one subject, in which it occurred on both sides, it arose by a distinct fleshy origin from the coronoid process below the origin of the flexor sublimis, and above that of the flexor longus pollicis. Its tendon, 6 inches long and of a good size, crossed over the ulnar vessels, and lay on the flexor profundus digitorum. It passed under the annular ligament, and blended in the lower part of the palm, with the tendon of the longus digitorum going to the little finger. Of the other cases *two* occurred in the same body, and one was present on the right side only. They had exactly the same attachment as above, and varied only in the point of junction of their tendons with those of the profundus. In all the junction took place somewhere between the middle of the palm and the distal end of the metacarpal phalanx.

Deep extensor carpi radialis longior.

In the forearm of a body in which a number of the more common variations were observed, a muscle, which might be called a *deep extensor carpi radialis longior*, was present. It arose, in common with the extensor muscles, from the external condyle, under the extensor carpi radialis brevior, but quite distinct from it. It had a fleshy belly about 2½ inches long, and of the size of the forefinger, and a tendon 6½ inches long, which accompanied the extensor carpi radialis longior through the annular

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ligament, and was inserted into the ulnar side of the base of the metarcapal bone of the index finger.

Special extensor of the middle finger.

In the same forearm as the last variation occurred in, a special extensor of the middle finger was observed. It arose from the lower 2 inches of the posterior surface of the ulna and adjacent interosseous membrane, below the extensor indicis. Its tendon, 4 inches long, passed through the same compartment in the annular ligament with the common extensor of the fingers, and blended on the posterior surface of the metacarpo-phalangeal joint with the tendon of that muscle going to the middle finger.

Accessory portion of abductor minimi digiti covering ulnar vessels and nerve.

In the left hand of a very muscular subject the fibres of the abductor minimi digiti arising from the anterior annular ligament were abnormally large, and constituted a large fasciculus about as large as the muscle itself, taking origin from the fascia lata, immediately above the wrist. This bundle of muscular fibre, about 3 inches long, passed down, completely covering the ulnar vessels and nerve as they lay on the anterior annular ligament, and blended with the outer side of the muscle arising from pisiform bone.

A well-developed palmaris brevis passed over it.

Superficial iliacus muscle.

This variation (1 in Fig. 6) occurred on both sides of the same subject, better marked, however, on the right side than on the left. It consisted on the right side in a flat band of muscular fibre, arising from the ilio-lumbar ligament and posterior one third of the inner lip of the crest of the ilium. It passed down at first lying posterior to the psoas magnus, then as a roundish muscle along its outer border, keeping in close

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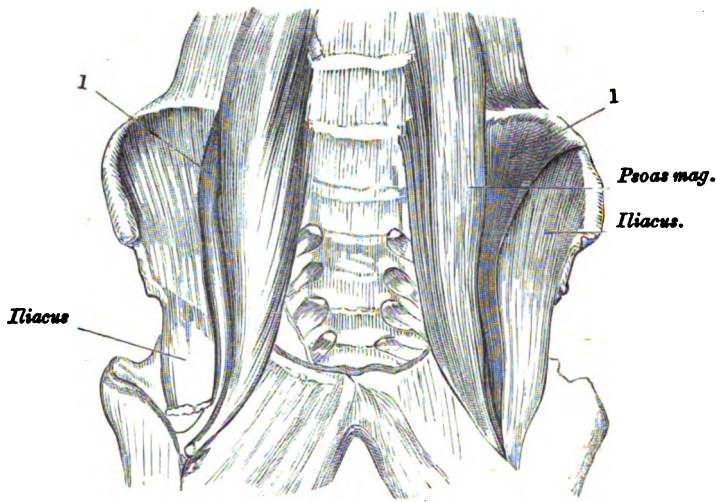
relation to it, to be inserted by tendon into the spiral line, and anterior surface of the shaft of the femur 1 inch below, and out-

Fig. 6.



side the small trochanter. The muscle was fleshy in two thirds of its extent.

On the left side the muscle was broader and thinner, and blended with the outer side of the tendon of the psoas below Poupart's ligament.

On both sides the anterior crural nerve was split into two by the tendon of this muscle passing through it.

On neither side was there any psoas parvus.

An accessory muscle in connection with the popliteus.

In dissecting the popliteal space of the left leg of a subject an unusual muscle was found in connection with the popliteus.

The outer head of the gastrocnemius possessed a rather large sesamoid (*S*) bone close to its attachment to the femur. From the inner side of this sesamoid bone arose a rather strong ten-

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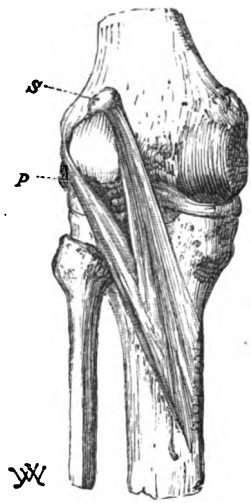
dinous structure, distinct from the gastrocnemius proper, and soon expanding into a well-marked muscle, which passed down-

Fig. 7.



wards to the tibia. The fibres were directed inwards as well as downwards, and lay superficially to those of the popliteus (*P*), ultimately becoming attached to the inner edge of the tibia as far as the oblique line, and also blending with the fibres of the popliteus. The popliteal fascia was spread over that portion of the muscle which was in contact with the popliteus.

It is worthy of note that the plantaris was absent, and that the general muscular development was not excessive; and also that no similar abnormality was found in the opposite limb.

The use of the muscle in the present instance was obvious. It acted as a flexor of the leg upon the thigh, and assisted slightly in rotating the tibia in the first movement of flexion.

This abnormality was recorded in the 'Journal of Anatomy,' vol. vi.

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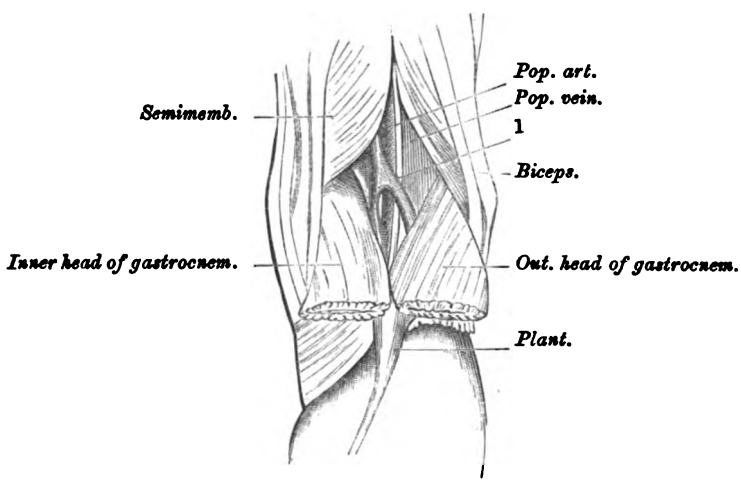
An accessory muscle enclosing the popliteal artery and vein.

In the popliteal space of the right leg of a male subject a muscle (1, in the accompanying sketch, Fig. 8) was observed, resembling to some extent the last mentioned. It consisted of a well-marked bundle of muscular fibres arising by tendon ½ in. long from the inner condyloid line, about 1¼ in. above the origin of the inner head of the gastrocnemius. It passed downwards and inwards, enclosing the popliteal artery and vein in a kind

FIG. 8.



of muscular tube, and blended with the outer head of the gastrocnemius.

A peculiarity in this case was that the artery and vein were surrounded by the fibres of the muscle, but not the internal popliteal nerve, which passed superficial to it.

The plantaris was well developed.

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A fourth peroneus muscle.

Among the abnormalities noticed as occurring in connection with the peronei muscles, none of them seem worthy of record, except a case in which a muscle half the thickness of the peroneus longus arose in common with it from the upper third of the outer surface of the fibula. It then separated from the peroneus longus, and opposite the middle of the fibula ended in a tendon, which passed through the same compartment in the annular ligament with the longus and brevis, and was inserted into the peroneal tubercle on the outer surface of the os calcis.

II.—Variations in Vessels.

Irrespective of the ordinary variations observed in the dissecting room, the following seem specially worthy of record. Besides these many other variations have been noticed, but they were of a kind which have been frequently recorded elsewhere, such as variations in the branches of the arch of the aorta, in the innominate, axillary, and brachial arteries, &c.

Abnormal course of inferior thyroid artery.

In dissecting the left side of the neck of a female subject, the inferior thyroid artery was of small size. It arose from the thyroid axis and passed forwards under the sterno-mastoid, but *over* the carotid sheath to reach the thyroid body. As it crossed the sheath it lay immediately below the lower border of the omohyoid muscle, and in superficial relation to the decendens noni nerve.

This variation in the course of the inferior thyroid artery is interesting, as it would be met with in the operation for ligature of the common carotid artery below the level of the omohyoid.

On the same side of the neck the vertebral artery arose from the arch of the aorta, and entered the foramen in the transverse process of the fifth cervical vertebra. The vertebral vein issued

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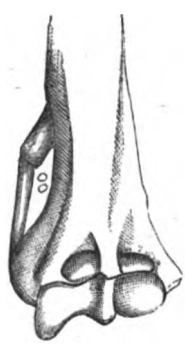
from the same foramen, and in its passage to the subclavian lay *under* the subclavian artery.

The vessels on the right side of the neck were normal.

Brachial artery dividing into two branches, one of which passed below a supra-condyloid process.

In the right arm of a fairly developed male subject the brachial artery divided opposite the lower border of the teres major into two branches, an anterior and posterior. The *posterior* branch, the smaller of the two, accompanied by the median nerve, passed to the inner side of the arm, giving off the two profundal and anastomotic branches. About two inches above the internal condyle it passed, with the nerve, from behind forwards, through a foramen (Fig. 9) formed by the supra-condyloid process above, and a specially strong band of the internal intermuscular septum below, which was attached to the apex of the process on the one hand, and to the internal condyloid line and internal condyle on the other. The artery then lay under the pronator

FIG. 9.



radii teres, and at the bend of the elbow divided into the anterior ulnar recurrent and interosseous trunks.

The *anterior* branch, the larger of the two, ran in the usual course of the brachial, giving off muscular branches, and

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divided one inch above the bend of the elbow into radial and ulnar arteries.

The *supra-condyloid* process, or *epicondyle*, was a hooked spur of bone about half an inch long, lying in the substance of the brachialis anticus, having the internal intermuscular septum attached to it both above and below.

There was no indication of this abnormality in the opposite arm.

Variations in femoral, popliteal veins, and vena cava inferior.

In both lower extremities of the same subject, and on the right side of another body, the femoral vein did not accompany the femoral artery through the opening in the adductor magnus, but passed, by itself, through the muscle one inch and a half above the opening for the artery, to join the profunda vein. Accompanying the superficial femoral artery, there was, however, a comparatively rudimentary vein, about the size of an ordinary cephalic vein, which started from the popliteal at the upper part of the popliteal space.

In both sides of another subject the popliteal and femoral arteries were accompanied by venæ comites, as high up as the origin of the profunda.

In another case the superficial femoral artery had two equally sized veins with it from the origin of the profunda to the opening in the adductor magnus.

In another popliteal space the relations of the popliteal artery, vein, and internal popliteal nerve were peculiar. The *vein* lay next the femur, superficial and external to which came the popliteal artery and nerve.

These abnormalities would be interesting in the operations for tying the femoral and popliteal arteries.

A curious variation occurred with reference to the vena cava inferior. It was formed behind the *left* common iliac artery, and ran up to the left side of the aorta, and, crossing over that vessel, passed into its fissure in the liver.

There was no transposition of the viscera.

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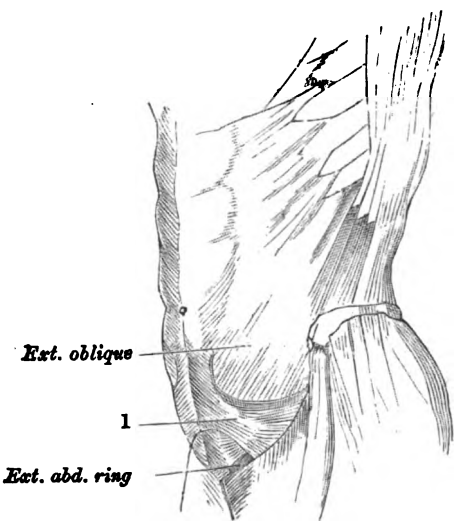
III. Variations in Fasciæ.

Specially strong intercolumnar fascia.

On both sides of the abdominal wall of a female subject a very strong layer of aponeurotic fibres (1, Fig. 10) arched from Poupart's

Fig. 10.



ligament upwards and inwards to the linea alba, above the level of the external abdominal ring, as shown in the accompanying drawing. The deeper fibres of the fascia, interlaced with those of the external oblique aponeurosis, and on the linea alba the fibres from opposite sides decussated very markedly with one another. The band had a distinctly defined border above and below, the upper one being concave upwards and the lower concave in the opposite direction. A very few fibres from the lower border passed over the external abdominal ring.

In another case (on both sides of a male subject) a similar

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band of fibres, three quarters of an inch broad, passed from the outer to the inner extremity of Poupart's ligament, arching over so as to cover the external abdominal ring, and sending a process, above the ring, to the linea alba, to interlace with a corresponding process on the opposite side. In this case the fascia formed most of the external aponeurotic covering of the cord.

The foregoing variations do not include many common ones which have occurred in the subjects dissected. They do not, therefore, form a record of all which have come under observation, but they are the most curious that we have noticed. We have thought it advisable to record these, as abnormalities are more than curious; they are often indicative of analogy in structure with other animals, and may serve at times to throw light upon pathological conditions.

We have to express our thanks to Mr. W. A. Cowen, who kindly made the drawings of several of the cases, and we have also to acknowledge the kind courtesy of Professor Humphry, who has allowed the use of the blocks from which Figs. 1, 2, 5, and 7, originally depicted in the 'Journal of Anatomy and Physiology,' are taken.

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SOME CASES OF

SUDDEN RECOVERY FROM MENTAL DISEASE.

By W. RHYS WILLIAMS, M.D.,
RESIDENT PHYSICIAN TO BETHLEM ROYAL HOSPITAL, AND LECTURER ON MENTAL DISEASES AT ST. THOMAS'S HOSPITAL.

In one of the latest and best works on psychological medicine it is stated that, "though recoveries from mental disease are sometimes rapid, they are perhaps never sudden."

The following cases present some features of interest, and as regards two of them the term sudden may fairly be used.

Case 1.—A. B., female, aged 49, admitted 1st February, 1870. Single. First attack when 27 years old. Duration of existing attack one month; previously confined in two lunatc asylums. Suicidal; dangerous; sober habits.

1st Medical Certificate.

Incoherent, with the idea that she is lost and cannot be saved; that the medicine given her was for the purpose of causing her to commit suicide.

Other facts.—She attempts to destroy herself by trying to throw herself from the window.

2nd Medical Certificate.

That she is incoherent and has delusions, viz. that she has been poisoned by drugs given to make her desperate and commit suicide. That she is doomed to eternal incarceration.

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Other facts.—That she is destined to be eternally lost. That she manifests suicidal tendencies.

History.—She has had one previous attack of melancholia twenty-four years ago, when only 27 years of age; has been quite well until one month ago, when she again became very melancholy, and since then she has become worse; had been out of health for some time previously. Is suicidal, but not violent to others. Has never had fits. Is very emaciated, and sallow, and weak. Is a marked case of melancholia.

March 2nd.—Mentally she remains as above described, and is especially taciturn, not speaking at any time. Her bodily weakness and emaciation are so great, and her refusal to take food so determined, that it was doubted whether she could possibly be kept alive. For the last fortnight she has been fed with the stomach-pump twice daily.

April 7th.—Still fed with the stomach-pump.

May 9th.—Still fed with the stomach-pump.

June 20th.—The stomach-pump has at last been discontinued after four months' daily use.

July 26th.—Is slightly improving.

September 29th.—Has decidedly improved in health, has gained flesh, though still very thin, and is less sallow. Her mental condition is little changed; she is, however, cleanly, and occupies herself with needlework at times.

November 9th.—Continues in much the same condition.

1871, March 6th.—No mental improvement; she cannot be induced to speak a word.

July 10th.—No change.

1872, September 15th.—During the past twelve months there has been no change; she always has her head bowed down, and never speaks a word to any one; is in weak bodily health.

1873, January 2nd.—No improvement. When opposed she is very violent. Exhibits strong tendency to suicide, will put her head on the floor, and place the whole weight of her body on it, apparently in the hope of breaking her neck. Has made several attempts at strangulation by tying strings round her neck.

January 10th.—Without any warning, this patient yesterday morning, on being addressed as usual by the attendant said, "Good morning," and conversed cheerfully and rationally.

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She is in very weak bodily health, but as regards her mental state she is apparently quite convalescent.

March 7th.—Has gradually improved in body; there has been no return whatever of the mental symptoms.

June 18th.—This patient is now in good mental and bodily health, and is discharged to-day cured.

Since her discharge I have had frequent opportunities of seeing this lady. There has been no return of the mental symptoms.

Case 2.—C. D., female, aged 43, single, admitted November 13th, 1873. Schoolmistress. First attack; duration, two months. Supposed cause, overwork and mental anxiety. Not suicidal, not dangerous.

1st Medical Certificate.

She has become restless and capricious, which she tells me is quite opposite to her former feelings; disposed to wander from place to place; is irritable and disposed to violence; confessed that she had struck a lady who was with her yesterday; says she is hunted by two ideas, which prevent her employing herself.

Her sister complains that she has lately frequently struck her, and says her habits have been completely altered.

2nd Medical Certificate.

Entire change from her usual habits and manner, inability to occupy herself with her ordinary pursuits. She sits mooding, and occasionally becomes angry and passionate without sufficient cause.

Her cousin states that to-day when out for a walk she struck her and her sister with great violence, and without any apparent cause, and that she screamed loudly in the street when wanted to return home.

Catamenia ceased August 29th, after a slight flow; irritability of temper followed at once. Bowels inactive, eight or nine days often elapsing without relief; urine is long retained. She dreads going to a water-closet.

November 20th.—The patient is a tall, slender, lady-like person, prematurely grey hair, anxious, restless look. At present she is quiet but unoccupied, fairly sociable, clean and tidy. Eats and sleeps fairly. She is constantly asking to be discharged, "as she is well." She does not exhibit any delusion.

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November 28th.—Since the last note she has been more suspicious, and evidently has illusions, fancying people influence her.

December 4th.—Restless and suspicious, will neither read nor work. She only broods and thinks.

11th.—About the same. She guards herself carefully, and hides her delusions, but careful watching shows she has plenty.

1874, January 8th.—No change. *Galvanism daily.*

February 5th.—No further change.

April 10th.—No improvement. *Discontinue Galvanism.*

May 29th.—She has been more obstinate about her food, and has to be fed with every mouthful. During the last fortnight has had peculiar blisters form on her right cheek and beneath the eye.

June 10th.—Is obstinate and untidy. She does nothing.

July 28th.—Is more tidy, and will occasionally occupy herself.

August 10th.—No further improvement.

September 4th.—Has been losing flesh for some weeks past, and is more obstinate, if possible, than ever. She sits all day unoccupied, and with her head bent forward. No symptoms of lung disease.

October 8th.—No change.

November 5th.—Up to dinner time no change. She suddenly said, "I feel changed, and am now quite well." She looked cheerful, and spoke easily and rationally, with no excitement.

6th.—Is apparently quite well.

December 20th.—Continues well, and is discharged on a month's leave of absence.

1875, January 27th.—Has remained well, and is discharged to-day cured. This lady went abroad, and up to the present time there has been no relapse.

Case 3.—E. F., female, aged 32, admitted June 11th, 1875. Duration of existing attack eight days. Commenced a few hours after the birth of her first child. Suicidal and dangerous; has been of strictly sober habits.

1*st Medical Certificate.*

I found her lying quite impassive, taking no notice of sur-

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rounding persons or objects; she could not be roused to any rational conversation, or induced to answer questions.

I am informed by her husband, that from time to time, she becomes violently excited, strikes the bystanders, and tears her clothes.

2nd Medical Certificate.

That her statements are rambling and incoherent; that nurse and also myself have improperly treated her, and that her mind cannot connect any idea, &c., &c.

Her nurse says that she continually keeps talking and moving her arms "to keep her blood going," and that "she is an electric machine."

History.—She had "brain fever" two years ago. She is said to have been always quiet and affectionate. Very shortly after her confinement became strange in manner, complaining of headache, rapidly became violent, and got worse up to date of admission. Had to be restrained, otherwise would have got out of bed, and thrown herself about; asked for a knife repeatedly to cut her throat; also made the rags she had about her into a rope and tried to strangle herself with it.

June 12th.—This patient is a very weak thin person, who at present has to be kept in bed. Bowels confined; urine has had to be drawn. She has belladonna plasters to check the milk. Has free lochial discharge. She is noisy, destructive, sleepless and dirty. Most obstinate in refusing food, retaining it in her mouth, and then ejecting it.

14th.—Very weak; refusing food. Temperature 100°; respirations 28; pulse 110. She is fed with fluid food, brandy, milk, eggs, &c., &c.

16th.—Rather better; temperature 98·8°.

17th.—Again worse, restless and noisy; temperature 101·3°; skin moist, tongue furred, bowels obstinate, still refusing food.

20th.—Her bodily condition has improved a little, but there is no change in her mental symptoms.

24th.—Is stronger, very maniacal, destructive and dirty in her habits, takes her food better, bowels still obstinate.

27th.—Is now able to be up daily, maniacal and incoherent.

July 5th.—This afternoon woke up after a short sleep quite well and rational.

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14th.—Continues well, and has been sent to our convalescent establishment in the country.

August 11th.—To have a month's leave of absence.

October 6th.—There has been no return of the mental symptoms, and she is discharged to-day cured.

This patient on recovery had no memory of any of the incidents of her mental attack. She remembered her friends removing her baby, and then "woke up to find herself in Bethlem."

These cases present some features of interest:

I. *The very sudden recovery in the first case after long-continued mental symptoms.*

Cases are on record of sudden recoveries, but as a rule they are not to be trusted, and the apparent recovery is generally very transient in its nature.

II. *As to the form of mental disorder.*

It is manifest from the course and termination in each case the lesion was not of a destructive character, but must have been functional or dynamic.

Dr. Buzzard, at a meeting of the Clinical Society, mentions a somewhat similar case, where the symptoms of extreme mental depression existed for more than four years, during which time the patient was fed, dressed, and cared for, and during that time he did not speak. Last year he suddenly woke up, as it were, and though very weak at first, rapidly regained health and complete mental soundness.

Sir William Gull also mentioned the case of a gentleman who had been forcibly fed with the stomach-pump for more than five years, and had lately shown signs of considerable improvement. In each of these cases Sir William Gull was inclined to think there was a large element of hypochondriasis, and that the patients were not really insane.

As a rule hypochondriacs do not commit suicide, except in a negative way by refusing to take food, but in the first case I have reported the attempts at suicide were most frequent and determined.

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III. *As regards treatment.*

After obviating any general derangement or diseased condition of the system, I have not much faith in any special medical treatment. Electricity has been tried with benefit, though probably its moral effect has much to do with the improvement we find after its use. Dr. Buzzard suggests that means should be found to bring the influence of strong mental emotion to bear upon persons afflicted in this way, and though this may not always be easy, our chief hope of recovery must, I think, be placed in moral treatment.

When all other means have failed, and it is absolutely necessary to feed forcibly, I am decidedly in favour of the œsophageal tube. I seldom, however, use the stomach-pump, but have a funnel, which fits closely into the tube, and enables me easily to give the required nourishment.

In such cases as I have quoted it is not wise to make the feeding an agreeable process, and should the patient object to any particular method, perhaps by adopting it the resistance to taking food may be overcome.

In two of these cases when recovery took place there was apparently some recollection of what had occurred during the attack, though they could hardly ever be induced to refer to their illness.

I mentioned the first two cases at a quarterly meeting of the Medico-Psychological Association, and a brief notice of them appeared in the 'Journal of Mental Science.' I, however, venture to think them of sufficient interest to publish more in detail. I have purposely avoided laying down any strict rules for treatment, as at present I have not discovered any royal road for the cure of insanity. Every case must be treated on its own merits, and the institution that gives to its officers the best opportunities for studying the individual character of each patient must obtain the greatest success as regards the cure and alleviation of mental disease.

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ON THE

MECHANICAL ADJUSTMENTS OF THE SPHYGMOGRAPH.

By W. H. STONE, M.D.,
LECTURER ON PHYSICS.

The physiological import of the curves traced by the sphygmograph seems to have attracted more attention than the mechanical arrangements of the instrument itself. The clockwork movement has, indeed, by the care of so able a mechanician as Mons. Breguet, been brought to a very satisfactory condition; but the motion of the recording lever and the method of fixing the whole apparatus are susceptible of considerable improvement; since it is an axiom in mechanics that no chain is stronger than its weakest part, and slight defects in these apparently secondary appendages are capable of deranging to a serious extent the function of others far more perfect. The ordinary instrument is provided with two small wings, each pivoted at two points to the frame, and furnished with projecting hooks, round which a silken strap is looped, encircling the arm several times. There are so many objections to this plan that in more recent modifications it has been discarded or considerably altered. It is an obvious necessity that all obstruction to the vessels of the part should be prevented: no doubt the widening of the support for the arm materially diminishes, though it does not entirely remove, this tendency. Ligatures of all sorts are to be deprecated; the weight, moreover, of the clockwork and frame are left resting on the face of

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the forearm; thus liable both to constrict it and also to be set in heaving motion by strong arterial pulsation. In cases of cardiac hypertrophy this is a considerable force, even competent to communicate motion to the bed itself; and all such undulatory or periodic motions are magnified by the balanced index, so that instrumental waves rise to the position of a serious impediment in interpreting the tracing. With any form of ligature it is difficult to place the cushion of the spring fairly on the artery, or to shift it back again in case of its slipping.

It occurred to me from the first that the whole machine ought to be firmly supported independently both of bed and patient. A table may no doubt be made to fulfil these indications, though it is most usual to rest the instrument on the bedclothes: tables, however, cannot be altered in height, and are generally above the level of hospital beds. One of the largest retort-stands used in chemical laboratories, standing on a tripod foot, appeared more solid, more easily brought into immediate proximity to the patient, and enabled the hand-rest to be fixed at any convenient elevation. The screw clip of these is furnished with two holes in a metal block, one vertical for the stem, the other horizontal; into the latter I fitted with easy sliding motion a polished iron rod about fourteen inches long. This can be set fast in any position by a thumbscrew. Upon this rod slides a brass tube and block, fixed to a second tube at right angles to the first, containing a second rod, to the upper extremity of which is screwed the back of the hand-rest. The rest lies, therefore, with its hollowed face upwards, and is padded with a small quilted mattrass of silk or wool to prevent abrasion. Two broad leather straps confine the upper part of the forearm and the four fingers without any constriction, inasmuch as their breadth presses evenly and gently on a large surface of integument. Both the sliding tubes are tapped at their two ends with slightly conical screws, on which work large brass nuts milled on their circumference. By turning the milled head the last inch of the tubes, which is sprung for the purpose, can be steadily compressed on the iron rod. A graduated pressure can thus be obtained, which fixes the hand-rest at the desired angle with any required amount of firmness. Its action is far more satisfactory than the usual set screw. It takes hold of the whole rod instead of indenting one point, and when once fixed hardly ever

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slips. The hand-rest itself is hinged, and can be set by means of a brass bar and thumbscrew to any angle, so as to throw the radial region into more or less prominence.

Sliding on the stem of the retort-stand is another block, carrying another iron rod, to which is attached, by the means above named, a brass bar. To the latter is fixed the sphygmograph itself, the wings having been removed, and the brass bar fitted by filing and pins to the posterior pair of pivot holes. The cushion at the end of the spring thus stands out, by an independent support, just over the hinged part of the hand-rest. It can easily be lowered and rotated until it comes exactly above the prominent portion of the radial artery, where it is fixed by tightening the two conical screws.

Besides the advantage of great steadiness and freedom from imparted motion, this adjustment leaves the instrument itself easy to get at and unhampered by any surrounding parts. The only possibility of vibration lay in the iron rods themselves. This I have endeavoured to obviate by slipping over them two strong india-rubber bands, one on either side of the instrument. The different tension and difference of vibration-number of these seems perfectly to counteract any springing apart of the rods themselves, and renders the apparatus what is termed by workmen "dead," *i. e.* free from tremor or oscillation.

Having thus worked legitimately upwards from the floor to the sphygmograph itself, there are several mechanical points within it which deserve attention; namely, the avoidance of friction, the reduction to a minimum of moment of inertia in the index, its perfect counterpoising, and the prevention of coerced, that is, deceptive, curve-tracing.

In the instrument, as supplied by the Paris maker, slips of enamelled paper are clipped on to a brass plate, and a steel tracing-pen draws the curve in violet ink. Tracings thus obtained are exceedingly pretty, but far from being trustworthy. The friction of the pen is considerable even on smooth paper, and is increased by capillarity and the viscid properties of the ink. I soon found it essential to employ glass with a smoked surface according to the usual method. Thin British plate smoked on its polished side answers perfectly. By this means a different style or tracer could be used. It consists of a small piece of aluminium wire filed to a fine chisel-edge, and

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fixed to the end of the index in place of the steel tracing-pen. It is extremely light, and has hardly any friction against the polished glass surface. In consequence of this diminished weight a great step is taken towards reduction of moment of inertia in the index. The upward jerk at the commencement of the curve is materially lessened without any coercion of free movement. Besides this plan another, tending towards the same end, was already on my instrument when I received it. The intermediate lever between the spring and the index is entirely done away with, connection between them being made by means of a small screw attached to the former and taking into the teeth of a very minute racked wheel, about three sixteenths of an inch in diameter, on the arbor of the index itself. The moving mass is thus greatly reduced, and that of the racked wheel, being concentric about the axis, and near to it, produces the minimum effect.

The counterpoising of the index arm struck me as the next mechanical point to be considered. A counterbalance weight acting by means of gravity would have largely increased moment of inertia, and would probably have coerced the motion by pendular oscillations on the principle of the metronome.

These objections do not apply to a helical spring, which is unaffected by gravity, and may be made to have any given period of oscillation. I have only roughly sketched out this part of the work, but enough to show that it may be made to act. A fine steel wire is coiled into a little spiral, and attached by its two ends to silk threads; one end is wrapped round the index arbor in the opposite direction to that in which the index tends to rotate it, the other is fixed, with means of increasing and diminishing the pull, to the brass base of the sphygmograph. This little appendage, besides enlarging the path of the tracing point, may be used as a means of setting it fairly on the glass, which is equivalent to raising or lowering the axis of x.

In all this description an error of the early sphygmographs has been carefully avoided; that, namely, of coercing the pointer in its motion between two opposing springs. To a certain extent the pressure-spring must do this on one side, but the old method of preventing the kick upwards by a spring bearing with variable force on its upper surface is entirely fallacious, and

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ends to vitiate the tracing in its most important part, namely, at the summit of its excursion; a point, moreover, where its own motor energy is tending towards equilibrium, and its characteristic features are the most easily obliterated. With such a spring badly applied every tracing would become round-headed. The oscillations would resemble those of the pendulums to be seen in many clockmakers' windows, where the going train is underneath, and two small friction wheels bear against the sides of the bob. These have never been made to go well in consequence of the bob being between two "bankings" (to use a good workshop term), or, in other words, because the simple harmonic motion is, as it were, foreshortened and brought to a premature end by an opposing force applied to the long arm of a lever with too great a mechanical advantage.

One or two collateral points deserve mention; and especially the importance, as it appears to me, of separating two distinct operations now injudiciously combined,—I mean the estimation of pressure, and the form of the curve obtained. It seems to have become usual to judge of a tracing by a mental jumble of these two totally heterogeneous elements. Any accurate result must be as impossible mathematically as it is to multiply nautical miles by sacks of potatoes.

The curve, if it have any distinctive properties of its own, should be considered on this ground simply. No doubt the amount of pressure borne by an artery is an important element in the diagnosis of hypertrophy, tension, atheroma, or aneurism. But it is quite alien to wave-laws, and rebellious to co-ordinate geometry in any form.

To assist in elucidating this point I have made the glass slip on which the tracing is drawn much broader than those usually supplied. It is then practicable to examine side by side three or even four tracings made at increasing pressures. From these the most characteristic should be selected, the pressures being collated independently. A good method of graduating pressures seems still a desideratum; the rotation cams of Dr. Mahomed hardly, as far as I can judge from a limited number of trials, securing the needful accuracy. Dr. Sanderson's original plan of lifting the distal end of the instrument off the arm by measured amounts will probably work

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better; inasmuch as it excludes the very complicated problems involved by transmitting the pressure through the mainspring. A common balance-beam with one scale-pan removed, or with a light wire extending downwards from it to lift the point of the spring in successive positions of the distal end, would give the best possible approximation to the acting weight. Each instrument ought obviously to have these determinations made upon it singly; as no two springs could be made with exactly the same modulus of elasticity.

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ON

SOME CASES OF "BLEEDERS."

By WILLIAM MAC CORMAC, F.R.C.S.,
SURGEON TO AND LECTURER ON SURGERY AT ST. THOMAS'S HOSPITAL.

By the term Bleeders I understand those comparatively rare and little understood cases of apparently hereditary tendency to excessive hæmorrhages without adequate cause, or sometimes without any cause. I think the plain English word is preferable to the rather inapposite name of Hæmophilia, for these persons part with their blood far too easily to have much love for it, as the term would seem to imply. However, whether called bleeders or described as examples of hæmophilia, I hope the account of two cases, recently under my care, may prove of sufficient interest to warrant its being placed upon record.

Case 1.—The first instance which I had the opportunity of observing was that of a boy called Alfred Burrill, twelve years old. A bright-looking intelligent lad, with a clear, rather rosy, complexion, and delicate skin, blue eyes and fair hair. He was admitted to the hospital, under my care, in November, 1874, on account of pain and swelling in the right knee, which had appeared a fortnight before without known cause.

On examination the affected joint was found to be much distended by effusion within it, and was very painful and hot. The pain was worse at night, preventing the boy from sleeping. Much tenderness was felt all over the joint, and pain on pressing its surfaces together. There was some fever, with slightly increased temperature.

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The treatment consisted in resting the limb in a splint, and applying ice for a time. In a fortnight the swelling had nearly disappeared, as also the pain. He left the hospital quite convalescent five weeks after admission, the knee being enveloped in a light gum bandage with plenty of cotton-wool padding, as some pain was still complained of if the joint was much moved.

It was ascertained that the boy had suffered on two or three occasions previously in a precisely similar way, and that he had had twice most severe bleedings from trifling wounds. When seven years old he bit his tongue, and the wound continued to bleed for seventeen days. During the previous summer he fell and slightly cut his hand with a bit of iron, and the hæmorrhage from this did not stop for a week.

The lad says he is subject to severe bruising from the most trifling blow; in other terms, extensive ecchymosis takes place. On one occasion we had an opportunity of observing his extraordinary tendency to bleed. To allay the great pain he complained of in the knee he was ordered to have a subcutaneous injection of morphia. This was done by the dresser in the usual fashion, and immediately afterwards the forearm, near the puncture, began to swell, and continued for two days to increase in size, the limb becoming enormously swollen and very tense. It seemed as if the skin were in danger of giving way, or that gangrene might take place. By rest, and application of cold, further effusion became by degrees arrested, and absorption gradually took place, the arm showing all the varieties of colour witnessed in extensive ecchymosis.

Two uncles on the mother's side died from bleeding, one after extraction of a tooth at the age of seventeen, the other at five, from some trivial hurt.

He also had a brother in whom a slight cut in the finger was followed by death from bleeding. Another brother, two years older, is also a bleeder, but his remaining and oldest brother is exempt. He has five sisters, none of whom show the hæmorrhagic tendency.

The elder uncle, Thomas Chubb, who died, had been a patient in St. Thomas's Hospital. From the few notes to be found of the case it appears he had had a tooth drawn from the upper jaw the day previous to admission. It had come away without difficulty, but the bleeding had never ceased. He was treated

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by Mr. Simon by various local and general means—opium, acetate of lead, and tincture of iron, internally, various styptics and the actual cautery to the bleeding part, but without success; the bleeding continued, and he died twelve days after admission from loss of blood. In this case the hæmorrhage on three occasions was temporarily arrested, but it recurred each time without provocation.

The accompanying genealogical table puts in a clear light the hereditary tendency in the family (see next page).

Case 2.—Edwin Eaton, æt. 6.

The little boy who is the subject of this observation is at present under my care. He is a bright, intelligent child, with clear, ruddy complexion, thin skin, blue eyes, and fair hair. On examination a tense, elastic, hard, freely moveable tumour was felt lying over the seventh rib on the left side, just beneath the nipple. There was no discoloration or injury of skin, and no pain or tenderness. The tumour was sharply defined and the bulk of half a walnut, and the skin adherent to surface. Only on inquiry into the history was it possible to say what the swelling consisted of. The boy said he had been struck in the side that morning at school with a pencil by a child of his own age and size. He felt nothing at the time nor afterwards, and the swelling was accidentally discovered by his mother. The boy said he was subject to bleedings from the nose and mouth, and easily bruised; while from his mother a very complete family history was obtained, as may be seen in the following table (see page 115).[1]

The paternal grandfather is a bleeder. He had two sons, one of them the father of my little patient, both bleeders, and three daughters, one of whom is a bleeder.

The boy's father has two sons, Edwin, æt. 6, and Harry, æt. 4, both bleeders, and an infant daughter.

Case 3 is Thomas Simpson, a boy of 15, who has been repeatedly an inmate of this and other hospitals. At present he is under Mr. Simon's care for separation of the lower epiphysis of the femur. The effusion which followed the injury was so

[1] The information contained in these tables was collated with much care by my dresser Mr. Nicholson, and for the considerable trouble he took in the matter I beg to thank him.

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TABLE I.—Robt. Chubb (70) *m.* Eliza (70).

(No history of bleedings in either, and they knew of none in their predecessors).

Robert (45) (No bleedings.)	Frederick (38) (No bleedings.)	Elizabeth (34) (No bleedings.)	Fanny (39) (Quite healthy, no bleedings.)*	Joseph (4) (Continually bled from the nose, and gums. Had a bad bruise which burst out and he bled much. Was very easily bruised. Had swelling of his joints. Slipped off a chair, received a small cut on his head, and bled for forty-two hours, when he died.)	Tom (17) (Nearly bled to death several times from small cuts. Had swellings of his knees. Had a tooth extracted, and after bleeding eleven days, died.)	Eliza (30) (No hæmorrhage.)	Sarah (25) (No bleedings.)
Joseph (19) (No hæmorrhage.)	Eliza (1) (Died from bronchitis.)	Walter (15) (Has bled a good deal from his nose, and nearly died. He bruises very easily. Bleeds a great deal from the gums when shedding his teeth.)	Alfred (13) (Used to bleed a good deal from his nose; does so now when he gets excited. Bleeds a great deal from his teeth when they come out; when seven years old nearly bled to death, Bruises very easily. Has swelling of his knees.)	Emily (9) (Quite healthy.)	William (3) (Bit his tongue and bled for three weeks. Clipped the skin of his finger with a pair of scissors, and bled ten days, when he died.)	Fanny (4) (No bleeding.)	Annie (2) (No bleeding.)	Ada (14 days) (Healthy.)

* Married James Burrill (41), who has good health, and has never had any bleeding. He has nine brothers and two sisters, all of whom are exempt from bleedings.

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TABLE II—CHARLES EATON (aged 60), carpenter.

(Bled for more than a fortnight after the extraction of a tooth. Frequently cuts himself at his work, and always bleeds freely. Nearly bled to death from tooth.)

- Charles, aged 35. (Used to bleed very frequently from nose when young.)
- Edwin, aged 32. (Is a carpenter, and frequently cuts his fingers, when he bleeds very freely; from a superficial chisel wound will lose a teaspoonful of blood or more. Suffers from frequent epistaxis.)*
  - Edwin, aged 6, (Has bled from the nose three or four times during the past two years, and about half a teacupful of blood was lost at a time. Bruises very easily. When cut or scratched bleeds freely. From the scratch of a pin several drops of blood are lost.)
  - Harry, aged 4. (Has bled two or three times freely from the nose. If cut he bleeds a good deal. Bruises a great deal.)
  - Eliza, aged 1.
  - Infant. (Died during parturition from strangulation.)
- Emma, aged 30.
- Eliza, aged 25. (Bled for a week when she had a tooth out. Suffers from menorrhagia. Has hæmoptysis. Once nearly bled to death from tooth.)
- Louisa, aged 20. (Twelve months ago vomited a large quantity of blood at the menstrual time.)

* Edwin's wife does not appear to be of the hæmorrhagic diathesis, but she has two brothers who bleed frequently from the nose once or twice a month; she herself has two other brothers and a sister who seem well in health, and she has lost a sister of "consumption," and several others who died in infancy.

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immediate and so extensive that it was difficult to suppose it could be caused otherwise than by rupture of the main vessel of the limb. For three weeks, in spite of treatment, the swelling continually augmented; the skin was tense, tightly stretched, and inflamed. It seemed as if it must give way, and Mr. Simon determined to use the aspirator. Nothing came through the cannula, but much relief followed by the draining away for some hours of thin serous fluid from the puncture. Afterwards the puncture was sealed by collodion, and from that day forth the swelling continued to diminish, and became gradually absorbed, until at present the parts have almost regained their normal size. There are black ecchymoses on the forearm from merely leaning on the edges of the iron bedstead, showing what slight pressure suffices to cause bruising.

The history of this boy presents a remarkable tendency in him to bleeding. When two years of age a large lump formed on his forehead after a tumble. The mother states the whole face became black. The tumour was incised in one of the hospitals, and the child nearly bled to death. When five years old he was admitted to another hospital with swelling of both knees. During the next eight years of his life he was admitted to different hospitals for swellings of the knees, ankles, and the elbow. Sometimes one joint only was affected, generally the knee, sometimes both knees, once both knees and both ankles, once, two years ago, the knee and the elbow, for which he was also treated by Mr. Simon. On one occasion he all but bled to death from the nose, and repeatedly he has had severe attacks of epistaxis. About eighteen months since he was admitted under Mr. Jones' care. He had fallen six days previously off the arm of an easy chair, and two days after a large blood tumour had formed on the outer side of the thigh extending from Poupart's ligament to the knee; the skin over it was tense and much discoloured. The boy's body was found covered with bruises. Puncture of the swelling was made with a trochar, allowing an escape of dark venous blood. He made a good recovery in spite of several attacks of epistaxis, and the swelling became wholly absorbed.

The family history is in this case negative; the father, a sailor, was drowned two months before the boy's birth. He has neither brothers nor sisters, and his mother herself ex-

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hibited no tendency to bleed. She has, moreover, married again, and has three or four children : all healthy.

Case 4.—Henry Platt, æt. 24, was under the care of Mr. Jones. Seven years before he had nearly lost his life from hæmorrhage occasioned by biting his tongue. He had frequent epistaxis and bleeding from gums. A large swelling, not caused by injury, formed around lower part of femur about ten days previous to admission. It was tapped by aspirator trochar; blood came away. The tapping required repetition, the tension and swelling increasing, when pus was found to be mingled with the blood. Inflammation set in, an incision became necessary, and four porringers of offensive blood and pus, mixed, escaped. The wound continued to bleed, and in spite of treatment he sank exhausted a fortnight after admission.

In this case no family history of bleeding was obtained. The post-mortem examination was negative.

Case 5 was that of a man, æt. 33, who was admitted under Mr. Wagstaffe's care for hæmorrhage from the socket of an upper molar tooth which had been extracted four days before. He was subject, he said, to attacks of bleeding from trivial causes, and twelve years since had hæmorrhage for eight days after the drawing of a tooth, which was arrested by the actual cautery. On the present occasion, he continued to bleed after admission to hospital for fifteen days, the socket of the tooth being repeatedly plugged with lint steeped in perchloride of iron solution, the solid perchloride used, and actual cautery as well. The bleeding stopped after the patient nearly lost his life, and it is not clear that the arrest was caused by the treatment. The blood, in this case, appeared to coagulate normally; there was no increase of temperature, and the pulse was normal. The application of the actual cautery only stopped the bleeding for a few hours. With respect to this man's family history, all that can be discovered is that he has three brothers and three sisters, and also four sons and three daughters, none of whom have ever bled. He has, however, one son who occasionally bleeds from the nose, and has once bled for a short time after the extraction of a tooth.

From a surgical point of view Bleeders are obviously interesting cases. From time to time surgeons have operated on

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such persons, not being aware of their idiosyncrasy, and the patient has bled to death. I do not know of anything about these persons calculated to arise suspicion beforehand. The existence of ecchymoses on the surface should always indicate the propriety of inquiring into the previous history of the case, for by this we shall perhaps find out the evil tendency in time. A bleeder should never be touched by the knife. Other methods may offer, where the necessity for an operation arises, a greater degree of security, but no certainty against subsequent bleeding. Thus, for instance, the galvanic cautery loop, the écraseur or the elastic ligature, may prevent hæmorrhage at the moment, but when the slough separates, it is but too likely to appear.

The cases I have been able to quote illustrate the remarkable exemption which the female appears to enjoy, but though themselves free from the disease, the women of bleeding families seem all the more capable of freely transmitting the disease to their progeny, that is, the daughter or sister of a bleeder, though herself healthy and married to a healthy man, may have a family, the boys of which shall all be bleeders, and the fact of the mother being herself a bleeder does not appear to intensify the power of hereditary transmission. A father whose brothers are bleeders, but who is himself exempt, may transmit the disease, and sometimes apparently with greater certainty than if he himself were also a sufferer. In other cases a whole generation seems to be skipped.

Any part of the bleeder's body may bleed profusely when injured, or be the subject of large subcutaneous effusions, the result of contusion; and it is worthy of notice that these hæmatomata should not ever be incised, as thus the hæmorrhage becomes very dangerous, being generally greater than from a simple wound.

The bleeding, whether due to injury, or spontaneous in its origin, is capillary, or *en nappe* if the wounded surface be an exposed one. No individual bleeding point can be seized and isolated, and the quantity of blood lost is sometimes enormous.

It is a common but erroneous idea that the blood does not coagulate or coagulates imperfectly in these cases; for, as was seen in Mr. Wagstaffe's case, the blood may coagulate normally, and so it generally does in other cases in the first blood lost. After

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protracted hæmorrhage it ceases to coagulate firmly, as the blood then becomes thin and watery.

The blood tumours, of which Case 2 presents an example, may sometimes reach, as in Cases 3 and 4, an enormous size, even as big as a child's head. They may arise spontaneously as well as after injury. They do not often suppurate, and are usually absorbed. They should if possible not be meddled with, or at most the aspirator introduced for the purpose of relieving tension.

In other cases, as in the one first described, the larger joints are affected by a painful swelling. The knee is the one most commonly attacked, the elbow, ankle, shoulder, and hip being occasionally the seat of the disorder.

The symptoms usually observed are similar to those in the case first related, the amount of effusion may be sometimes enormous, the pain is generally great; but the skin, although hot over the joint, does not redden or show the usual symptoms of an acute inflammation, and suppuration rarely or never takes place.

Generally, as in the cases recited, the swelling in the joints comes on spontaneously; at other times, but more rarely, the occurrence is connected with an injury. There is much tendency to relapse and recurrence of the disease, as illustrated in Case 3, while to guard against it in my first case I had the joint carefully immobilised, after covering it with a thick layer of cotton wool.

What the exact nature of the effused fluid in the joints may be is unknown. It used to be considered a mere effusion of blood, but the complete absorption of a large quantity of effused blood could scarcely be effected so rapidly as a fortnight, and the joint restored to normal shape and size. The swelling often disappears after a few days, but often it may last for months. Possibly in the one case a small quantity of blood may be shed in the joint, which, acting like a foreign body, may set up a synovitis capable of speedy resolution; but if the quantity of blood poured out by the synovial membrane be considerable, the symptoms are more severe, and the swelling persists for a much longer time. In some cases I believe there is a peri-articular effusion of blood, provoking a synovitis within the articulation, but without effusion of blood within the joint.

As for the intimate pathology of the disease it is yet to be

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worked out. If the blood be essentially changed in its characters, either chemical or physiological, what the change may be has yet to be seen, with aid of the microscope, spectroscope, and chemical processes.

The arteries appear, in some cases at least, to have been subject to atrophic changes, or rather not to have been normally developed. Their coats are thin, wanting in elasticity, and, although Virchow was unable to discover any change in the capillary vessels themselves, it is not too much to infer that these too may be the seat of some morbid alteration, the more so as capillary hæmorrhage is the form in which bleeding occurs. The capillary vessels may be less fitted to resist rupture, and in possession of less vital contractility to enable them to check bleeding when once it has been established. But on what such a change depends, if it do exist, I have no explanation to offer.

All kinds of internal treatment have hitherto been mostly attended with negative results, the tincture of the sesquichloride of iron with the mineral acids being perhaps the least inefficient remedies. For the local arrest of the bleeding our usual methods prove utterly inefficient. The hæmorrhage has gone on too often without a check. If it stop, it appears frequently to do so more of its own accord than by reason of the treatment directed to arrest it. To relieve the tension of large extravasations the aspirator may be used with advantage, although, as the blood is usually coagulated, only bloody serum will probably be exhausted. It is better, however, not to meddle with them at all.

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ON

SEVERE HÆMORRHAGE AFTER TEETH EXTRACTION.

By W. G. RANGER,
ASSISTANT-DENTAL SURGEON.

That excessive hæmorrhage after tooth extraction may arise from other causes than the one usually given in our text-books —the hæmorrhagic diathesis—cannot, I think, be doubted. But rarely, if ever, is any other admitted by these authorities. This oversight has possibly arisen from alarming hæmorrhage being of somewhat rare occurrence, considering the immense number of teeth extracted.

Certainly if a tooth be removed from an individual who is the subject of hæmorrhagic diathesis the consequences are most alarming, as we have lately had occasion to witness in the practice of this hospital. The case I refer to has been published by Mr. Wagstaffe, in the 'Lancet' of October 9, 1875.

It has happened, though rarely, that death has resulted from the extraction of a tooth.

Dr. Fitch quotes a case, from 'Le Dentiste Observateur,' par H. G. Courtois, 1775, of a man, having scurvy, who had a canine tooth extracted which terminated fatally after the ninth or tenth day; all means failed to stay the hæmorrhage. In this case the bleeding gradually spread from the seat of extraction until there was not "a single place in the whole mouth from which the blood did not issue."

In the eighth volume of the 'Royal Medical and Chirurgical Society's Transactions' there is a case published by Richard

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Blagden, Esq., of a young man, aged twenty-seven, who had the second upper molar extracted, June 30, 1861, which was followed by continued and profuse hæmorrhage. Several attempts were made to stay the bleeding, amongst which were the application of lunar caustic, a plug of sponge soaked in blue vitriol, cold applications, and the actual cautery; finally, Mr. Brodie (July 5th) tied the carotid artery. The hæmorrhage, however, still continued; and the wound made by the operation, though bleeding but slightly at first, soon began to bleed profusely. Ice was used, but, notwithstanding all efforts, the patient died on the morning of the 7th, a week from the time of the removal of the tooth. "After death the trunk of the carotid was examined. It was found to be of its natural texture, except that there were several opaque, white depositions on the outer surface of its inner coat, such as precede ossification. The temporal and some other branches of the external carotid were also examined; their coats appeared to be thinner than usual, and nearly transparent."

The early history of this patient goes to prove a hæmorrhagic tendency; as a boy he had a tooth removed which gave rise to serious bleeding. "If he cut himself accidentally, or received any other slight wound, hæmorrhage took place to a greater extent than in ordinary persons, and was more difficult to stop."

In a person having this tendency the bleeding after extraction is, as a rule, immediate and continued, though at first of so slight a character that the patient is allowed to return home, and the symptoms seem to call for no active interference; but as the oozing continues, and by degrees becomes more copious from a determination of blood to the part, and the consequent enlargement of the vessels, the bleeding becomes more alarming, and the condition of the patient necessitates surgical aid. I say as a rule, for there doubtless are instances where the hæmorrhage may be said to be secondary; this is well shown in the following case, which occurred in the practice of Mr. J. W. Elliott, to whom I am indebted for the following unpublished notes:

Mr. M., a gentleman of middle age and in good health, wishing to have some artificial teeth supplied, consulted me. On examining his mouth I found a loose stump lying on the surface of the gum, which I proposed to remove. My patient then informed me that some years before a dentist in filing the stump

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of a tooth had very slightly wounded the gum adjoining, which resulted in bleeding for six or seven days, notwithstanding every effort made to suppress it. He told me also that his brother, with whom Sir Astley Cooper passed the whole of one night, had died from hæmorrhage after the extraction of a tooth. Under these circumstances, thinking that the stump would soon be separated from the gum, I advised him to wait. In about three months I saw him again, and as he much wished to have the artificial teeth, his mastication being very imperfect, and as the stump had the slightest possible attachment to the gum, I consented, under certain conditions, to remove it. He made arrangements not to attend to business matters for some days, and I exacted from him a promise to avoid exercise and stimulants, and, in fact, to use every precaution of which I could think. The stump was removed by a gentle touch with the finger-nail; there was scarcely one drop of blood lost, and the red point in the gum where the stump was attached was so small as to be hardly perceptible. Mr. M. went home, followed my directions, had a good night, woke in the morning perfectly well, and after breakfast began to think, as I subsequently heard, that in the treatment of his case I had advised more precautions than were necessary. He therefore took a long walk, afterwards ate a hearty dinner, and followed it up with a glass of brandy and water. In the afternoon, about twenty-four hours after the removal of the stump, bleeding commenced, and continued increasing through the night, though Tinct. Ferri Comp. was applied to the part and ice was freely used. When I saw him in the morning the red point had become enlarged, and the bleeding surface now formed a circle a quarter of an inch in diameter, and though the hæmorrhage was comparatively slight, there was quite enough in the history of the case to cause anxiety. It was merely capillary oozing, which the actual cautery would have at once stopped, but I feared when the eschar came away we should find we had only postponed the difficulty and made matters worse.

I therefore syringed the part well with cold water, dried it with pieces of amadou, then covered the bleeding surface thickly with rather coarsly powdered matico, which I kept *in sitú* by a dossil of lint so formed and arranged that the closure of the mouth should bring upon it tolerably firm and equal pressure. This

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happily had the desired effect; the matico, without producing irritation formed a crust with the few drops of blood which exuded after it was applied, and, except taking the precaution to keep the part covered for a few days, I had no further trouble with the case.

The brother of this gentleman having died from hæmorrhage after the extraction of a tooth, one might be led to infer something of a family taint in this peculiar diathesis, but I have extracted teeth for his son and daughter without a similar complication following their removal.

Mr. Cattlin, in a paper read before the Odontological Society, and published in their 'Transactions,' April, 1871, says: "The intractable bleeding which occasionally follows the extraction of a tooth leads me to think that some morbid condition of the coat of the artery, or lack of nervous force, may at times influence its contractile power. Perhaps blood would flow from a *diseased* vessel which had been rent in an oblique direction than from one which had been divided transversely; or it may be that there is some degree of obliquity between the two extremes which would favour the flow of blood from a vessel the muscular coat of which had lost its contractile power. The pulpy condition of the periosteum at the end of an inflamed root may involve the coat of vessel and destroy its vitality."

While agreeing with Mr. Cattlin in these remarks, I am inclined to believe that another form of this contingency is due more to a mechanical than to either a general or (if I may so term it) to a diseased local agency. The results are not so alarming, but still are quite sufficiently so to demand cautious and prompt assistance. We occasionally find on examining teeth after extraction that they have excessively large apical foramina, compared with the usually minute openings that serve for the transmission of the dental nerve, artery, and veins; and although this condition may obtain without excessive hæmorrhage being a result, it should, I think, when noticed, serve as a caution to the practitioner and to the patient.

It would appear reasonable to suppose that if this opening be enlarged the vessels must be so likewise, and this I believe really occurs. From my own observation I am inclined to the idea that the supplying artery is the vessel usually increased in size. This vessel traverses the bone above or below the inferior or superior

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dental arteries before entering the fang of tooth, and is held *in situ* by the connecting tissue surrounding its external coat and attaching it to the bone. It is obvious, then, in this mechanical arrangement, that we may have a fruitful source of danger, for after the artery is torn through it is unable to contract; and although, as frequently happens, a fair clot may form in the alveolar cavity, and the bleeding be thus apparently arrested; should the patient from active exertion, such as a long walk immediately after the operation, or while eating, or from a dependent position such as lying in bed, in any way dislodge the clot, the hæmorrhage recommences from the one orifice, and becomes most difficult to suppress without surgical treatment. I have had several cases brought under my notice that appear to be only explained in this way, one or two of which will serve to illustrate this opinion.

In the latter part of 1873 a lady consulted a dentist in the north of London for the purpose of having the right upper first molar removed. After the extraction she walked home a distance of two miles; nothing unusual occurred until the middle of the same night, when she awoke and was alarmed to find her mouth filled and the pillow saturated with blood. Ordinary means were resorted to, but the bleeding could not be arrested. At the end of about twenty-four hours after the extraction a medical man was sent for; the alveolar cavity was firmly plugged with lint, which arrested the hæmorrhage. The patient tells me that the blood was of a bright florid colour, and that there was no unusual violence used during extraction; unfortunately the tooth was not examined. I have since removed the corresponding molar on the opposite side, but the bleeding ceased after a few minutes and she had no return of it.

September 28th, 1875.—I removed a small epulis from left lower jaw of woman, æt. 48, out-patient of this hospital, with the écraseur. As it was likely that stumps of first lower molar and second bicuspid teeth were implicated in the disease, I removed them with the elevator; four molar stumps were extracted, and there was no bleeding of any consequence; but after the removal of the bicuspid the hæmorrhage became excessive, and on clearing away the clots the blood spirted up in a tiny jet from bottom of alveolar cavity. The fang had a large apical opening, and there cannot be the least doubt that the

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bleeding came from its supplying artery. After some little difficulty the hæmorrhage was arrested by small pellets of cotton wool steeped in Sol. of Ferri Perchlor., and carried well down to the bottom of the alveolar cavity, so as to form a graduated and firm plug. The mouth was kept closed for some hours and the plug left in; the following day it came away by itself. There was no return of the bleeding.

In the early part of 1872 I was consulted by a young woman, in the service of a medical man. She had suffered much from toothache; I advised the removal of a lower molar. The tooth, on examination after extraction, was found to have the foramen at apex of one fang much enlarged. She was cautioned that possibly troublesome bleeding might supervene, and was kept in my rooms till the hæmorrhage had completely subsided. On returning home a distance of some miles the bleeding again commenced, but was arrested by cold water. She went to bed, awoke in the night, feeling faint, to find she had lost a good deal of blood; usual means were resorted to, but the hæmorrhage continued. The following day medical aid was sought and the bleeding temporarily arrested. The cavity was again plugged later in the day, and the hæmorrhage finally stayed. From this patient I had removed teeth before, and have done so since this recorded case, with no bad results whatever.

I am indebted to my friend, Mr. Dickenson, of St. Leonards-on-Sea, for the following notes:

"I was called to see a gentleman (age about 30) at 9 o'clock in the morning, who had been bleeding profusely since 2.30 the previous afternoon, having had the first right lower molar and two or three stumps removed by Mr. ——, under methylene. A medical man had during the night plugged the alveolus with wool saturated with a styptic, syringed into the mouth iron solution, and given doses of gallic acid, with no result. I cleansed the mouth from clots with a sponge, and found the blood pumping very freely from alveolus; this I endeavoured to staunch by a plug of moistened rolled matico leaf, covering with wool. As the bleeding did not cease, I next plugged with wool steeped in matico solution; this failing, used wool with styptic colloid. The plugs were pressed very firmly into the socket, but still the blood oozed up freely. The patient was very low. I then proceeded to plug with wool saturated with matico tincture, forcing it well

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into alveolar cavity; upon this I placed a piece of sponge, covering this with a lower mouth-tray (such as used by dentists to take impressions of the lower jaw); by these means the bleeding was arrested at once. As there were only three or four lower incisors remaining, and nearly all tender stumps in the upper jaw, I placed pieces of cork and lint on the tray, closed the jaws firmly, and passed a bandage under the chin and over the vertex. The patient was kept in a sitting posture, was able to swallow, and took some egg and brandy and doses of gallic acid during the day. The tray was removed the next morning. The sponge was kept in position by tongue compressor until evening, when it was allowed to fall away gradually during night. The wool plug came out about two days after with a slight return of hæmorrhage. The patient was sent for a fortnight's change, and returned recovered. Some ten years previously the gentleman suffered from hæmorrhage after the removal of an upper molar."

Cases of hæmorrhage after tooth extraction have been recorded that are vicarious of menstruation. This can only be looked upon as a coincidence, and must be rare. General treatment is indicated.

With regard to treatment the most reliable is plugging either by a thin strip of lint steeped in a styptic, and carried completely to the bottom of alveolar cavity, and gradually doubled and redoubled upon itself until a dense and graduated plug is formed; or by pellets of cotton wool saturated with perchloride of iron, beginning with small ones, and gradually enlarging them till the alveolus is thoroughly and firmly filled, when a pad of lint or cork should be placed over the plug, the jaws closed, and a bandage passed over the head and under the chin.

The use of an impression tray either for upper or lower jaw would keep the compress in position and aid the pressure.

In cases of a hæmorrhagic diathesis, especially where there is a tendency to extension of bleeding over the mucous membrane of mouth, I would suggest, after the part had been thoroughly cleansed from blood, that an impression tray filled with plaster of Paris, mixed with warm water to which a little salt has been added (as the plaster then sets more rapidly), be applied as if about to take an impression of the mouth, and kept in position for twenty-four hours. By this means we should have a firm, unyielding compress all over the jaw. Wax and gutta percha, I

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think, are hardly to be relied on; they are difficult of application, and not usually satisfactory when applied. The actual cautery is contra-indicated, as when the eschar comes away it merely extends the bleeding surface; and should it accidentally touch the lips, cheek, &c., would add a fresh source of danger. Powdered matico leaf is a valuable agent in some cases. The patient should be kept in a sitting or semierect posture, in a cool room; avoidance of stimulants should be enjoined, or anything in fact likely to increase the vascular action; at the same time the importance of general medical treatment must not be over looked.

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ON HARELIP.

By FRANCIS MASON, F.R.C.S.

There are few subjects in surgery that have attracted more attention than the congenital malformation known as harelip, and it is not to be wondered at that the deformity should have excited so much interest, inasmuch as it is an obvious physical defect which greatly distresses the patient's parents as well as the patient himself, who throughout life is more or less painfully conscious of his condition.

The principal objects of the present communication are, first, to give the results of inquiries made into the history and literature of the subject of harelip, briefly referring to such topics as are not usually included in works on systematic surgery; second, to illustrate by cases that have been under observation, chiefly at the hospital, some practical points in the treatment of the malformation; and lastly, to group together the most important operations that have been devised and practised for the relief of the deformity.

Harelip is a congenital malformation, arising from an arrest of development of the fœtal structures. Some writers speak of it as being produced by accidental wounds, as from burns, ulcerations, &c., in which the edges have not united,[1] but the term harelip should be restricted to the congenital variety. It would, for example, be obviously improper to speak of such a

[1] Samuel Cooper's First Lines, p. 501.

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case as this (fig. 1, taken from a photograph) as one of harelip. The patient was a girl, aged 14, recently under my care at

Fig. 1.

the hospital, the greater portion of whose lip had been bitten off by a woman. The wound healed slowly, and ultimately there was very little deformity. Pigné draws a suggestive distinction between the two conditions, in saying that an accidental harelip may affect indefinitely all kinds of shape and position, but the congenital form is always more or less perpendicular to the free edge of the lip, and has a red margin.[1]

The various forms of harelip are too well known to require a lengthened description. The fissure may be on one side only, and therefore called unilateral or single harelip, or on both sides —bilateral or double harelip, and in rare cases it may extend towards the cheek, constituting commissural harelip. The extent of the fissure into the cheek differs, but if it involve Steno's duct then the persistent discharge of saliva causes great discomfort to the patient.[2]

Fig. 2.

Fig. 3.

The cleft in the upper lip may be a mere notch, single (fig. 2) or double (fig. 3), or it may extend into one nostril (fig. 4), or

[1] Costello's 'Cyclopædia of Practical Surgery,' art. "Lips."

[2] Follin et Duplay, 'Traité élémentaire de Pathologie externe,' t. 4, p. 639.

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into the nostril on both sides (fig. 5). In some instances of double harelip the fissure reaches the nostril on one side only,

Fig. 4.

Fig. 5.

leaving a simple notch on the other (fig. 6); and in cases in

Fig. 6.

which the intermaxillary bones project, the soft tissue may either be united to the bone, thus (fig. 7), or be perfectly free,

Fig. 7.

Fig. 8.

thus (fig. 8). Any of these varieties may be complicated with a cleft in the hard or soft palate or in both.

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The upper lip is, as a rule, the seat of the deformity, and if a careful examination of the part be made, it will be found that in many cases there is in reality very little want of tissue, the lip being simply cleft on one or both sides. Sir W. Lawrence spoke of harelip as being "a mere separation" [1] of the parts, and M. Louis long ago drew attention to this point, remarking that in the deformity, whether the fissure be in one or both sides, "it is not accompanied by any loss of substance." [2] Although this theory does not invariably obtain, I have nevertheless seen several examples to make me believe that there is much truth in such statements; for instance, I was particularly struck with the appearance of the part in a case of double harelip, which was sent me in the summer of 1875 by my friend Mr. John Teale, of Scarborough. The accompanying engravings (figs. 9, 10) show very well how closely in contact the fissures were,

FIG. 9.

Full face, to show close approximation of fissure.

FIG. 10.

Side view of ditto.

and taking a side view it will be observed that the deformity is scarcely perceptible.

All surgeons are, I believe, agreed that the left side of the upper lip is by far the commonest situation for the deformity, and I am enabled to corroborate this from personal experience; thus, of 48 cases that have come under my observation, 24 were

[1] 'Lancet,' 1829. Vol. ii, p. 813.

[2] Louis, "Mém. sur le Bec-de-lièvre" ('Mém. de l'Acad. Roy. de Chir.,' tt. 4 and 5).

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on the left side, 16 on the right, and 8 were double or involved both sides.

The other varieties of the deformity are rather surgical curiosities; thus, instances are on record in which the cleft was situated absolutely in the median line, which, as is well known, is the normal condition in the hare, and from which the malformation no doubt derives its title. Mr. Hazard, of Litcham, Norfolk, refers to such a case,[1] and M. Sanson cites an instance from Moscata, which he considers authentic, of "median harelip."[2] MM. Follin et Duplay, too, allude to such cases. "Nicati[3] has seen a child two years of age in whose upper lip there was a congenital fissure exactly in the middle line, and Blandin has observed the same condition in the embryo.[4] MM. Bouisson et Nélaton saw two analogous cases in the museums of Strasburg and of Tübingen, and others are reported by Ammon, Leuckart, and by Bitot, of Bordeaux.[5] This condition must, however, be rare, inasmuch as Sir William Fergusson, whose experience on the subject of harelip is as great, if not greater, than any other living surgeon, states that he has never seen an instance of the defect in the mesial line.[6] Chaussier, Dupuytren, and Cruveilhier, too, regard such cases as impossible.

In some instances the upper lip is altogether absent, as in a specimen at the Royal College of Surgeons, in which that part and the palate are entirely wanting.[7]

More rare still is a fissure involving the lower lip. About fifteen years ago I had the privilege of assisting Sir William Fergusson to operate in a case of this kind, which is the only instance that has come under my observation. The case is admirably depicted in his work on 'Surgery' (5th ed., p. 506). There are not many examples of this kind recorded, but Ranvier alludes to them.[8] One result of such a deformity is that the saliva dribbles away, which is not only an an-

[1] 'Med. Times,' July 2, 1864.
[2] 'Lancet,' 1834, vol. ii, p. 665.
[3] 'De Leporini Labii nature et origine,' Amsterdam, 1822.
[4] 'Dict. de Méd. et de Chir. Pratiques,' art. "Bec-de-lièvre."
[5] 'Journ. de Méd. de Bordeaux,' 1851-52.
[6] 'Lectures on the Progress of Anatomy and Surgery,' 1867, p. 56.
[7] 'Ter. Series,' No. 158.
[8] 'Comptes Rendus de la Société de Biologie,' 3rd sér., t. iii, p. 93.

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noyance, but is detrimental to the patient's health. Mr. S. Cooper refers to a patient under the care of M. Tronchin, who had a fissure in the lower lip, and who suffered from dyspeptic symptoms, all of which were removed after an operation had been performed.[1]

An instance is recorded, by Parise (de Lille), of fissure of the lower lip combined with fissure of the lower jaw, with fissure of the tongue.[2]

Vrolik, in his beautiful work,[3] gives several illustrations of commissural harelip and other deformities about the face; and M. Guersant figures a remarkable example, in which the fissure on each side extended to the eyelids[4] (fig. 11).

Fig. 11.

There is another complication of harelip that I have occasionally met with, and to which I can find no reference in the text-books on surgery. It is a cyanotic condition of the child. This was well marked in a case that was sent me by my friend Mr. Haynes, of Waterloo Road. The late Mr. Edwards, of Edinburgh, alluded to this point; and Mr. George Lawson has published an interesting case, in which the cure of the cyanosis

[1] Costello, loc. cit., p. 811.

[2] 'Bull. de Thérap.,' 1862.

[3] 'Tabulæ ad illustrandum embryogenesis hominis,' 1849.

[4] 'Dict. de Médecine et de Chirurgie Pratiques,' t. 4, art. "Bec-de-lièvre."

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was effected by the operation for closing the fissure in the lip. During the operation for the harelip the child fainted; and Mr. Lawson believed that the recovery from the cyanosis was due to the lull in the circulation produced by the faintness, and which allowed the foramen ovale to close, and thus establish the double current.[1]

Again, other deformities sometimes coexist with harelip; thus, once I saw a child who besides a harelip had an extra thumb on each hand, and another who had a bad internal squint, and a third who had a large nævus on the buttock.

Dr. Morell-Mackenzie has met with a case in which there was a congenital fissure between the arytenoid cartilages, with a trilobate epiglottis occurring in conjunction with harelip and cleft palate.[2]

Occasionally the surgeon meets with malformations which may be best termed incomplete. I was much struck with a case of this kind at the hospital some few months ago. The patient was a little girl about six years old, in whose nose there was a decided central dip extending the whole length of the nose, and a quarter of an inch in width, in which the skin was so thin that but for it the nose would have been cleft. Mr. Streatfeild reports a somewhat similar example occurring in the upper lip. The patient was a boy, aged 9, who had a notch in the prolabium, and also a cicatrix in the mucous surface. His mother stated most positively that he never had had harelip and that no operation had been performed.[3]

It would be foreign to the purport of the present paper to enter into the minute details of the development of the upper jaw and the intermaxillary bones. The reader is, therefore, referred for information on this subject to the works of Kolliker, Leuckart, Nesbitt, Vicq d'Azyr, and others, and especially to an excellent pamphlet by Dr. T. Hamy,[4] and to a paper by Prof. C. O. Weber, "On the Intermaxillary Bone and its relations to Harelip and Cleft Palate."[5]

[1] 'Lancet,' June 7, 1862, p. 599.

[2] 'Med. Times,' April 19, 1862, p. 402.

[3] 'Med. Times,' Nov. 13, 1858, p. 499.

[4] 'L'os Intermaxillaire de l'homme a l'état normal et Pathologique,' 1868, Paris.

[5] 'Med. Times,' Jan. 4, 1862, p. 18.

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M. Coste[1] gives perhaps the clearest account of the changes that take place, and the following summary may be briefly referred to. He states that from the twenty-fifth to the twenty-eighth day of fœtal life the mouth is formed. The frontal lobe becomes much enlarged, and shows a great hollow which divides into two smaller lobes, called by him the incisive centres, and from which the incisive bones and the middle portion of the upper lip are developed. The centres for the superior maxillæ, which form the lateral parts of the upper lip, converge one towards the other and come nearer to each side of the corresponding incisive centre. At the fortieth day the two incisive centres in the substance of which the incisive teeth are developed unite the one to the other in the middle line, and thus complete the superior lip in its middle. Thus, if the two lateral portions do not unite to the incisive portions, we have a double or bilateral harelip; if only one of these sides fail to unite, then we have a single or unilateral harelip.[2]

The ossification of the upper jaw taking place at so early a period in fœtal life—about the seventh week—leaves anatomists still somewhat undecided as to the exact number of points of ossification in these bones; yet, arguing upon pathological facts alone, it appears certain that the intermaxillary bones exist, as first pointed out by Goëthe in 1786, as separate bones in man.[3] A case of Mr. Bryant's further tends to prove the fact; the patient was a child, aged three years, who had necrosis of some portion of the upper jaw which followed a severe attack of measles. With a pair of dressing forceps the dead bones were readily removed, and they proved to be perfect specimens of the incisive or intermaxillary bones.[4] Dr. Hamy refers to a similar case.[5]

Mr. Callender believes that the vomer and intermaxillary bones are developed in the membrane which covers the internasal cartilage, and at the anterior extremity of the vomer the process of ossification extends to form the intermaxillary bones.[6] These

[1] 'Histoire générale en particulière du developpement des corps organisés.'

[2] Follin et Duplay, loc. cit.

[3] 'Dem menscher wie den thieren, ist ein Zwishenknocken der obern Kinnlade Zuzushreiben.'

[4] 'Path. Soc. Trans.,' vol. x, p. 216.

[5] Op. cit., p. 76.

[6] 'Phil. Trans.,' 1869, p. 166.

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bones are generally described as containing the four incisor teeth, two on each side. Mr. Thomas Smith, referring to these bones, says,[1] "the junction between the superior maxillary bones on either side and the intermaxillary bone in the centre takes place between the incisor and canine teeth, so that the intermaxillary bone carries in it the germs of the four incisor teeth; the cleft, therefore, if it exist in the bone, is always found on one or both sides between the incisor and canine teeth." And referring to operative treatment, he adds, that "by removing the prominent part we deprive the patient of one or more of his teeth, therefore the part should be retained."

In Mr. Erichsen's work[2] there is a woodcut showing the intermaxillary bones containing the four incisors, but from the specimens of single and double harelip that I have examined I feel sure that one or both of the lateral incisors are almost invariably absent, or, if present, are slightly if at all developed. Mr. Callender remarks on this point that the intermaxillary bones "assist in forming no inconsiderable portion of the sockets for the incisor teeth; but that they do not completely form them is a fact occasionally confirmed by the imperfect character of the sockets which lodge these teeth in those cases of cleft palate which have the intermaxillary bone isolated from the superior maxillæ."[3] M. St. Hilaire, writing on this subject, in 1833,[4] says: "In the greater part of these cases the lateral fissure constantly corresponds with the point between the external incisor and canine teeth, or, in other words, to the line where the intermaxillary and maxillary bones should be united; but in some cases of more rare occurrence the fissure is found much nearer the median line between the *central and lateral incisors*."[5] Nicati, too, refers to similar examples. And, again, Dr. Hamy[6] observes that the fissure traverses sometimes between the central and lateral incisor; and further on (p. 58) he speaks of the fissure being in some cases between the lateral incisor and canine on

[1] 'Lancet,' Dec. 21, 1867, p. 761.

[2] 'Science and Art of Surgery,' 5th ed., vol. ii, p. 348.

[3] 'Op. cit., p. 169.

[4] 'General and Particular History of Anomalies in the Organization of Man and Brutes.'

[5] 'Lancet,' 1833, vol. ii, p. 531.

[6] Op. cit., p. 55.

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one side, and between the central and lateral incisor on the other.

It remains to be proved if this latter condition is so very rare, for it is certain that in most cases that present themselves to the surgeon the central incisors are usually well marked, whilst the lateral incisors seem to have no existence. In order to strengthen this statement the reader is referred to the different works on surgery, and he will find, I venture to say, that in almost all the woodcuts illustrating the deformity of harelip, the two central incisors only, and not the lateral incisors, are depicted. For example, Dewar, in his cases, published in 1830, speaks of the "projection of the alveolar process, which was covered by its ordinary thin and red membrane, and crowned with *two teeth*."[1] And Syme, in 1842,[2] remarks that in most cases of harelip the projection comprehends an equal portion of both superior maxillary bones, the portion, namely, which in the lower animals is occupied by two distinct bones, the ossa incisiva or intermaxillary bones; but in the woodcut that accompanies his remarks the central incisors alone are shown. Again, Dr. Stolworthy narrates a case[3] in which he removed the central portion, and in which the *two front* teeth, perfectly formed, were found; and M. Blandin reports a case of double harelip with projecting intermaxillary portion in a boy about ten years old, in which the *two middle* incisors were found.[4] Again, Sir William Fergusson, in his works on surgery, gives several woodcuts illustrating the presence of the central, and not the lateral, incisors, and all the specimens presented by him to the Royal College of Surgeons show the two central incisors only in various stages of development.

I have carefully dissected several examples of the intermaxillary bones removed in double harelip, and have been led to the conclusion that the lateral incisors are almost invariably absent. The accompanying illustrations demonstrate these points. The specimen (represented in fig. 12, in which the anterior part of the bones has been cut away to show the teeth) was taken from a child aged five months. The other

[1] Cases of Harelip. 'Edin. Med. and Surg. Journ.,' 1830, vol. xxxiv, p. 88.
[2] 'Principles of Surgery,' 3rd ed., 1842, p. 475.
[3] 'Lancet,' vol. ii, 1842-43, p. 326.
[4] 'Gaz. des Hôpitaux,' 'Lancet,' 1843-44. Vol. i, p. 71.

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specimen (fig. 13) was removed from a child aged fifteen months. In these cases there was not a trace of the lateral

FIG. 12.

FIG. 13.

incisors. Now, as it is generally known that the central incisors of the upper jaw are cut about the seventh month after birth, and that the lateral incisors follow pretty closely, appearing at from the seventh to the tenth month, the inference to be drawn is, that the lateral incisors are either wanting or are so ill-developed as not to be recognised. In other words, the cleft on each side seems to take their place. The same rule applies to single harelip, involving the jaw, as in the case of a child, aged two and a half years, whom Dr. Maybury, of Richmond, kindly sent me in April, 1875, and in which the lateral incisor was deficient. I may here say, after inquiring at the several museums connected with the metropolitan schools of medicine, that, with the exception of the specimens at the College of Surgeons and those at St. Thomas's Hospital, just referred to, the only other examples of intermaxillary bones removed in cases of harelip are to be found in the museum of Guy's Hospital, and these latter well illustrate the apparent absence of the lateral incisors.

Mr. Salter directed attention to this point in a case of harelip with double cleft palate, which he brought before the Pathological Society on March 6, 1855. The specimen was from a child eighteen months old, and contained the germs of the central incisors, and not the lateral as previously imagined. He adds, "From the general aspect of this specimen I was inclined to consider it as the incisor or intermaxillary bone separated by a lusus naturæ from the mouth proper; a section of it, however, throws some doubt on that opinion, as the rudiments of the lateral incisors are not contained in it, and such an idea is only tenable by imagining the laterals altogether suppressed." He made a vertical section, and in the cut surface were the imperfectly developed and rudimentary germs

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of the superior central incisors of the temporary and permanent set, the former advanced in development, the latter in a very early condition.[1]

I may add that my friend Mr. George Parkinson has kindly permitted me to examine his collection of over fifty models of the jaws in cases of harelip and cleft palate, and these abundantly prove that in most instances of harelip involving the jaw there is an absence of one or both lateral incisors. It should, however, be borne in mind that, apart from any congenital deformity of the lip, the lateral incisor is one of the teeth frequently wanting; thus, Mr. Tomes knows several families the members in each of which are destitute of lateral incisors in the upper jaw.[2]

There has been much speculation as to the causes of harelip. As a rule it is attributed to some shock or impression made on the mother during pregnancy. Sir William Fergusson, with many others, puts no faith in such views, and adds that he has often detected a partial defect in the upper lip and jaw of one or both of the parents, and since he directed my attention to this point, I have observed it in many instances.

I am myself somewhat slow to believe in the theory of maternal impressions, but I may allude to a case in which the coincidence was so marked as to leave little doubt that such impressions may have some influence in producing the deformity. In November, 1874, a child with single harelip was brought to me at St. Thomas's Hospital. The mother stated that whilst she was riding in an omnibus she was shocked at the appearance of a boy who had had harelip, and who had been operated on in early life. She had only been married a month, and spoke to her husband, mother, and sister of her fear that if she had a baby it might have harelip. When the child was born her first inquiry was, "Is he all right, or has he got a harelip?"

Again, in one of Dewar's cases, already referred to, the mother of the child resided previous to her marriage near a boy on whom he had operated for harelip, and she was perfectly familiar with the child's appearance. Soon after she became pregnant with her second child she was strangely impressed with the idea that

[1] 'Path. Soc. Trans.,' vol. vi, 1855, pp. 177, 178.
[2] 'Dental Surgery,' 2nd ed., 1873, p. 207.

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her infant was to be born deformed, and she had repeatedly assured him that the case of the boy was rarely absent from her imagination. Indeed, which is of more importance, she mentioned to some of her friends previous to her confinement the unaccountable presentiment she entertained of the child's deformity.[1] Sir James Paget, too, refers to another striking example. These cases may, of course, be only coincidental, but they are interesting to notice.

Harelip seems in many instances to be hereditary, for it is not very uncommon for a surgeon to operate on two or three members of a family. Liston operated on four;[2] and in the case which Mr. John Teale sent me (already alluded to) of double harelip not involving the palate, the mother had been very successfully operated on as a child for a single harelip on the left side, and I have at the present time (February, 1876), under my care at St. Thomas's Hospital two children, sisters, aged fifteen months and one week respectively with the deformity.

There are remarkable examples recorded to show that harelip appears to run in families. Thus, M. Demarquay related a case at the Surgical Society of Paris, in which from the grandparents downwards eleven children had been born with harelip;[3] and the same surgeon refers[4] to a singular malformation of the lower lip which was hereditary. The case was that of an infant affected with double harelip, and there existed on each side of the middle line of the lower lip a narrow channel containing clear mucus; a probe could be readily introduced and passed obliquely under the mucous membrane nearly as far as the frænum. The mother had the same deformity; she had had seven children, amongst whom four were born with harelip, and with precisely the same deformity of the lower lip as above described.

A correspondent in the 'British Medical Journal'[5] also states that in his family harelip had been handed down from one branch of the family to another for the last hundred years. He

[1] Loc. cit.
[2] 'Med. Times and Gazette,' 1865, vol. ii, p. 333.
[3] 'Lancet,' May 16, 1868, p. 642.
[4] 'Dictionnaire de Méd. et Chir.,' tome 4.
[5] 'Brit. Med. Journ.,' April 18, 1863, p. 412.

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says, "I have a brother who has harelip, with complete division of the palate and alveolar process; and he has had three children out of seven affected with the same deformity, in every case as badly as himself. Another brother of mine," he adds, "who is now dead, had a daughter also affected with the malformation. I had also a cousin who was similarly affected, and he had a daughter affected." Again, Dr. Bellingham, of Dublin, operated on two brothers whose relations on both sides had been similarly affected, and these were all males; thus their father's grandfather had harelip, and a second cousin of their father's was similarly affected. On the mother's side two of her second cousins (both boys) had harelip.[1]

With regard to the period of life at which the operation for harelip should be performed, the circumstances of each case are so widely different, that it is impossible to lay down any definite law. Generally speaking, it should be undertaken about the second or third month after birth, and this was the view taken by Lawrence,[2] Dupuytren,[3] Houston,[4] Rocca, and Mestenhauser.[5] Sir W. Fergusson prefers about the end of the first month,[6] and assuredly before teething. Others recommend leaving the operation until childhood; thus, Mr. South[7] remarks, "I would never perform it before two years old; but if the parents can be persuaded to wait till the child is six or eight it is preferable;" and Dieffenbach advised that the operation should be postponed until dentition was accomplished.[8]

On the other hand, Paul Dubois, Malgaigne, Bandon,[9] and Giraldés,[10] and Abernethy,[11] all approve of a very early operation, that is, immediately or soon after birth. Guersant[12] gives as a special reason for dealing with the de-

[1] 'Dub. Med. Press,' vol. 33, 1855, p. 161.
[2] 'Lancet,' 1829, vol. ii.
[3] Ibid., 1833, vol. ii, p. 293.
[4] 'Med. Press,' 1842, vol. vii, p. 274.
[5] 'Lancet,' 1846, vol. ii, p. 159.
[6] 'Lectures on the Progress of Anatomy and Surgery,' 1867, p. 64.
[7] Chelius by South, vol, i, p. 596.
[8] 'Lancet,' 1846, vol. ii, p. 159.
[9] Ibid.
[10] 'L'Union Médicale,' 1865, p. 188.
[11] 'Lancet,' 1850, vol. i, p. 694.
[12] Ibid., 1826, vol. xii.

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formity at this early period, *that children can do without the breast for four days*, an opinion shared by Mr. Douglas, of Stratford, who operated on a child two hours after birth.[1] M. Guersant further adds that, of seven children operated on immediately after birth, he failed only once, whilst out of seven children one month old he failed five times. Dr. Dawson, of Dungannon, operated on a child seven hours after birth.[2]

In some bad cases of double harelip the operation ought, in my opinion, to be done within the first three months, or even earlier, in order to save the life of the child. I have recently had under observation instances which have led me to this conclusion. I believe that in a great many examples we place patients in a worse condition to bear the operation by delay. They get thin and half starved and are then unfit to undergo any surgical procedure. Mr. Holmes, speaking of the indications that demand an early operation, says: "If the child is suffering from want of nourishment in consequence of the food running out of the cleft in the nose and mouth, no time should be lost in operating, whatever the age of the child may be."[3] Mr. Henry Smith gives cogent reasons for an early operation.[4] He thinks the child can suck better, and that in consequence of the lips being united the bones in the cleft palate (if it exist) become approximated. He refers, in illustration, to Mr. Bateman's patient, who was operated on four hours after birth. In answer to Mr. Smith's inquiry as to the condition of the patient, Mr. Bateman replied that the child had died at the age of three years of hooping-cough, and that at the time of death the fissure, which at birth was so large that the mother could put her finger into it, had contracted so much that it could scarcely admit the edge of a sheet of writing-paper.

Sir Astley Cooper,[5] Syme,[6] Colles,[7] and others, believing that convulsions are common after the operation, deprecated the practice of operating immediately after birth. The idea that the operation induces convulsions appears to be more

[1] Ibid., 1854, vol. ii, p. 456.
[2] 'Dub. Med. Press,' 1845, p. 359.
[3] 'Surg. Treatment of Children's Diseases,' p. 115.
[4] 'Med. Times,' 1854, p. 286.
[5] 'Lancet, 1823.
[6] 'Principles of Surgery,' 1842, 3rd edit.
[7] 'Dub. Med. Press,' March 20, 1844, p. 177.

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imaginary than real; and Sir William Fergusson, with his very large experience, states that he has never met with a single instance.

It is not often that an adult applies to have the operation performed, excepting as a secondary measure, and with the view of improving the lip, but such cases are occasionally met with. Three years ago I operated on a man aged 25, and Mr. Haynes Walton records a case of operation in a patient aged 40.[1] In some rare exceptions the person goes through life without seeking surgical relief; thus, I was told at the hospital in December, 1875, by the mother of a child with harelip, that a cousin aged nearly 50, residing in the country, had harelip on which no operation had been performed.

In bringing the edges together the twisted or harelip suture of silk is usually employed, and if used it is better to take the thread round the needle in the form of a figure of 8, and not as is sometimes described and practised, in a circular fashion, round and round the needle. This form of suture is especially advantageous in cases of double harelip when support is required. Its chief disadvantage is that it is apt to cause ulceration. In suitable cases the single interrupted suture is preferable, and is commended on the high authority of Sir Astley Cooper,[2] Erichsen, Giraldés, and Guersant, and I have myself had several cases recently in which I have employed it with very satisfactory results. Some surgeons dispense with pins and sutures, and rely *entirely* on plaster so placed as to keep the edges in contact.[3] The simple suture is preferable to the twisted, in bringing the edge of the lips together when divided for removing tumours of the upper jaw, &c.; but the twisted suture is better adapted for bringing the parts together after the removal of epitheliomatous growths, &c., from the lips, and also in cheiloplastic operations after burns.

Various substances besides silk have been used, such as catgut, horsehair, fishing twine, india rubber, &c. Some surgeons, especially MM. Giraldés, Depaul, Verneuil,[4] Ansieux,[5]

[1] 'Lancet,' August 22, 1857, p. 198.
[2] 'Lancet,' 1823, p. 97.
[3] 'Lancet,' vol. i, 1855, p. 485.
[4] 'Med. Times,' August 27, 1864, p. 226.
[5] 'Brit. and For. Med. Chir. Rev.,' vol. xxx, 1862, p. 543.

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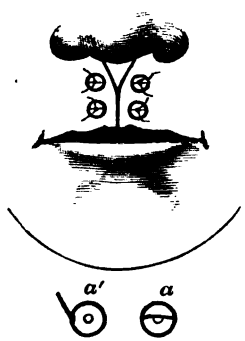
and others, prefer metallic sutures either of iron, silver, or silver-gilt. Others employ modifications of the shot suture of Bozeman and Sims. Mr. Brooke advocated bead sutures,[1] Mr. Pollock suggested a "gun-nipple" button, and Mr. Wood, of Gloucester, a suture which consists of one silver disc with a hole in it and a cross bar fixed at each end, and another disc, leaving the cross bar movable[2] (fig. 14, *a' a*). I have myself occasionally employed ordinary shirt buttons, which support the lip admirably. Van Onzenert used a piece of leather, with the same view,[3] and Dr. Hammer employed a quilled suture, keeping the parts together with silk ribbon.[4] M. Mayor used a ball of cotton for the same purpose.

Passing by the old practice of treating harelip by blisters and actual cautery, &c., I have now to refer to the various operations that have been suggested and practised to remedy the deformity of harelip; and in the first place I shall allude to

FIG. 14.



that which I believe to be the simplest and most rapidly performed, and attended as it is with the most satisfactory results to be the best. It is the one I myself almost invariably employ, carrying out the details as directed by my respected friend and teacher, Sir W. Fergusson. Let it be supposed

[1] 'Lancet,' May 21, 1859, p. 509.
[2] 'Med. Times,' Jan. 3, 1857, p. 4.
[3] 'Costello's Surgery,' art. "Lips," p. 599.
[4] 'Med. Press,' Aug. 2, 1865, p. 106.

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that the patient is a child, say two months of age, with a single harelip on the left side. The surgeon, being seated, first covers his knees with a towel or mackintosh. He then places the child, who is enveloped in a cloth or mackintosh, in the recumbent posture, the head being directed towards him, and resting on his lap, the feet being in charge of a nurse, who sits facing him. Chloroform or ether may or may not be administered. The surgeon then proceeds to free the fissure on each side, thoroughly dividing any frœna or adhesions between the soft parts and the jaw which seem likely to interfere with the easy adaptation of the parts. He then directs an assistant who kneels on his right to grasp the right side of the cleft between the forefinger and thumb of his right hand. The surgeon now grasps the other side of the cleft with his left forefinger and thumb, and introducing a sharp-pointed narrow knife at the nasal extremity of the cleft, commencing on the left side or that over which he himself has control, carries the knife from above downwards towards the prolabium, removing as much of the edge as he thinks necessary (fig. 15). The same steps are repeated on the opposite side. The assistant, still retaining his

FIG. 15.

hold on the lip, now seizes with his left hand the loose flaps of skin with forceps, and the surgeon removes them at their nasal extremities with one or two touches of the knife. Some surgeons prefer scissors for paring the edges. Up to this point, if care be taken, there should be scarcely a drop of blood lost. The surgeon now desires the assistant to relax his hold of the right side, and passes one or more harelip pins from side to side, rather more than a quarter of an inch from the raw margin, the first needle being introduced just above the red portion of the lip or prolabium. A piece of unwaxed silk,

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rather coarse, and nearly a yard in length, is then to be applied in the figure of 8 fashion, commencing at the nasal extremity, and the edges of the wound brought accurately together. Some surgeons prefer a separate thread for each pin, and put one point of interrupted suture through the mucous membrane of the lower part of the fissure just inside the mouth.[1] Others put interrupted sutures between the pins. Whatever plan be adopted, the threads are to be tied and their ends removed, after which the projecting portions of the needles are to be clipped, and if necessary a small piece of lint or plaster may be placed under their ends in order to protect the subjacent skin. Collodion may or may not be employed to cover the needles and thread. Several years ago I adopted a very simple and most efficacious plan of restraining the movements of the lip, by coating each cheek with a thickness of collodion about the size of a five-shilling piece, or larger. Broca refers to a somewhat similar method in 'Gaz. des Hôpitaux,' June 8, 1872.

In cases of double harelip the proceeding is much the same. If the intermaxillary bones so project as to prevent the edges of the wound from coming nicely in contact, they may be removed or dealt with in one of the ways that will be referred to presently. In most cases it is necessary to pare the central portion, so as to make a continuous raw surface of a V shape (fig. 16).

Fig. 16.

As a rule, both sides of the fissure may be closed at the same time. The lateral portions of the fissures are to be made raw in the same way and in the same order as already referred to in describing the operation for single harelip. The harelip pins, which in double harelip are almost essential, are introduced as before from below upwards, the surgeon taking care to include the central portion by transfixing it with one or more of the needles. Or the pos-

[1] 'Erichsen's Science and Art of Surgery,' p. 350.

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terior surface of the central portion may, in some cases, be brought upwards, and its lower end backwards, as recommended by Dieffenbach, so as to form a quasi septum to the nose.[1] The operation is concluded, as already described.

The pins may be removed by a rotatory motion with an ordinary pair of carpenter's pliers on or about the third or fourth day, or even earlier, leaving the thread to drop off. Subsequently a little zinc ointment may be applied, although not always necessary. In some cases it is desirable to support the edges of the wound with a strip of plaster, and, if used, it should be cut in this form with four tails (fig. 17). If the patient be care-

Fig. 17.

fully watched it seldom happens that failure occurs; and even in those cases which do not unite by first intention it is remarkable what very satisfactory results follow if even the least particle of the sides adhere by granulation. I have seen some of the worst looking cases of double harelip turn out well with care and attention; indeed, there is often less deformity after the operation for double harelip than there is after that for the single; at all events the deformity is more symmetrical. I have in some instances reintroduced the needle, but the plaster has generally answered the purpose best, if there be the least attempt at union.

If the case is such as to demand the removal of the intermaxillary bones, they may be taken away with scissors or forceps either a day or two before or at the time of the operation, and as there is sometimes free hæmorrhage attending this procedure, the actual cautery should be at hand. Mr. Wardrop referred to the removal of the bone in 1826;[2] and Franco recommended the entire excision of the bony mass, followed by an attempt to unite the two upper maxillary bones in the middle line.[3] Mr. Houston in 1842 operated on the intermaxillary bones by "paring off the outer lamina and removing the teeth, because the deformity it presented

[1] 'Holmes's Surgical Treatment of Children's Diseases,' p. 107.

[2] 'Lancet,' vol. xii, 1826, p. 800.

[3] 'Lancet, 1843-44, vol. i, p. 71.

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was such as could not be remedied by Desault's method of pushing it into place by a graduated pressure."[1] Guersant forced the projection backwards violently. Blandin took a V-shaped piece out of the vomer and at once pushed the bones backwards.

Sir W. Fergusson is a strong advocate for removing the intermaxillary bones, and in suitable cases takes them away by a kind of subperiosteal operation, enucleating either the whole of the bones or simply gouging out the incisor teeth.[2]

On the other hand, Mr. Collis states that the bone should never under any circumstances be taken away. This, he adds, "is so well established an axiom in surgery that it need not be insisted on;"[3] and Mr. Butcher in his work[4] figures certain instruments for "cutting through the projecting pieces in complicated harelip without dividing the soft parts and the vascular supply behind, previous to bending them back;" Langenbeck pared the edges of the prominent tubercle, and also the side of the maxillæ, and then transfixed the parts with a harelip pin.[5]

In witnessing the operation for harelip a bystander might suppose that the proceeding is a very simple affair, but there are a few practical points to which attention may be directed. It is of importance thoroughly to free the lip from the jaw on each side, so that the edges of the wound may be brought into contact without any strain on the pins or sutures, and in doing this the surgeon should remember to apply his knife quite close to the maxillary bone, as suggested by Franco,[6] for in so doing the risk of hæmorrhage is diminished. Moreover, a sufficient quantity of the edge of each cleft should be taken away. As a rule too little is removed; hence an unsightly vertical dip is left. Then the incision should be made somewhat concave, with the concavity directed towards the fissure, and a sufficient amount of the prolabium should be taken away which obviates the V-shaped dip so often noticed after the operation. This concave incision was practised by Dieffenbach and others, and Syme

[1] 'Dub. Med. Press,' 1842, p. 1842, p. 131.
[2] 'Brit. Med. Journal,' Dec. 25, 1875, and Jan. 1, 1876.
[3] 'Dublin Quart. Journal,' 1868, p. 299.
[4] 'Essays on Op. Surg.,' p. 715.
[5] 'Archiv,' vol. ii, p. 230.
[6] 'Costello's Surgery,' vol. ii, p. 813, 1861.

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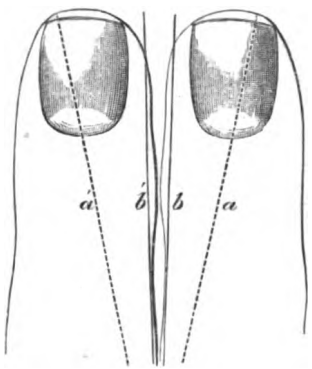
mentions it in the third edition of his 'Principles of Surgery.' The idea, however, seems to have been first suggested by M. Husson, jun., in 1847.[1]

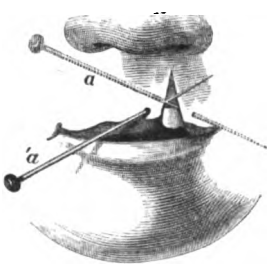
In describing the operation to pupils, I am in the habit of making them place the forefinger of each hand in apposition, thus—

Fig. 18.



and of assuming that the two fingers have to be united to make one perfect finger. It is clear that if this object is to be effected the incision must be carried in the direction of the dotted lines (*a' a*, fig. 18), so as to include the greater portion of each finger, for if a narrow strip only is taken (*b' b*, fig. 18), it is evident that

Fig. 19.



a groove will be left between the fingers and also a V-shaped gap at their extremities.

[1] 'Path. Ch.,' vol. ii, p. 703, 1847.

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Then, in introducing the needles, the first should be placed nearest the prolabium, and it should be inserted on the right side from below upwards, and on the left side from above downwards (*a' a*, fig. 19). This manœuvre tilts down the prolabium, and thus brings the margin into a straight line. Dupuytren referred to this point in 1833, and he remarked that it was then not new.[1] Further, the needle should not go through the mucous membrane, but with that exception should transfix the whole of the lip. There are two reasons for carrying the needles to this particular depth: first, in order to give the greatest support to the sides; and, secondly, to secure to the superior coronary artery which lies close to the mucous membrane. M. Giraldés passed the stitch through the whole thickness of the lip.[2] The ligature should not be drawn too tightly, otherwise the compression may cause ulceration. The edges should simply be brought together neatly, and if the precaution of thoroughly dividing the adhesions to the jaw, as already described, be attended to, there will be very little tension on the parts. In cases where the tension is very great it may be useful to follow the practice of Ambrose Paré, and make a vertical incision on each side of the ala nasi, but such a proceeding is seldom necessary.

Finally, with regard to the duties of the assistant. He should be especially careful to compress the side entrusted to him firmly, and not relax his hold until he receives the signal from the surgeon. Moreover, in grasping the lip during the paring of the edge he should take care not to drag the part away, but rather to push it inwards towards the cleft so that the knife may make the necessary curve with the concavity towards the fissure as already stated.

There are yet two other points that have especial reference to the patient. It often happens after the operation that the upper lip will necessarily be so tightly drawn that the nostrils become temporarily closed, and the lower lip so contracted as to pout to such a degree as to overlap the upper, and thus interfere with respiration. In such cases it is only necessary to charge the nurse or mother to press gently from time to time the lower lip or chin downwards, so as to allow the air to enter

[1] 'Lancet,' 1833, vol. ii, p. 295.

[2] 'Bull. Gén. de Thér.,' 15 Août, 1863. 'Brit. Med. Journal,' Sept. 19, 1863.

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the mouth. This may appear a simple matter, but it is as important to the comfort as it is to the safety of the child. Again, the position of the child in sucking is one of some importance, for in severe cases of harelip, complicated with cleft palate, if the patient be placed in the recumbent posture the food is apt to pass through the nostrils instead of down the pharynx, hence there is risk of death from starvation. Under such circumstances it is only necessary to raise the child to the upright position, when deglutition can be readily accomplished.

It is obvious that no single operation is universally available for examples of harelip, and it is fortunate that the surgeon has a choice of numerous modes of procedure which have been successfully practised, and which may, no doubt, be again as successfully employed in suitable cases. To these I will now refer:—1st, as to the operation known as Malgaigne's. It appears that this operation was, as M. Roux states, previously performed by Clémot,[1] but Dr. Maurice Collis, of Dublin, writing in 1868, claimed it as the device of an English surgeon. Alluding to this (M. Malgaigne's operation) he says: "I learnt it twenty-one years ago from a fine old English surgeon, the late Samuel Smith, of Leeds. He told me that he had devised it some twenty or thirty years previously (that is, about 1820). Whether he ever published it I do not know. This improvement consists in reserving the lower portion of the parings at each side and turning them downwards so as to form a prominence along the margin."[2]

Malgaigne's operation is thus described:—He commences the incision at the superior part of the lip, and performs it from

FIG. 20. FIG. 21.

Malgaigne's operation.

above downwards, employing scissors in the same manner as in

[1] Nélaton, 'Path. Chir.,' vol. ii, p. 703. 'Costello's Surg.,' vol. ii, p. 821.

[2] 'Dublin Quarterly Journal,' May, 1868, p. 294.

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the ordinary operations, only when he arrives as low as possible (fig. 20, *a a'*), without detaching the cut piece, he stops. The same plan is followed on the other side of the labial fissure. There are then two small flaps which are adherent to the lip by a pedicle. After having reunited, by the aid of pins, the two margins of the cleft, in their whole extent, except towards their free border (that is, towards the bottom), these flaps are brought from above downwards, and approximated face to face (fig. 21, *b*, *b'*). The operator then judging of the length which it will be proper to leave them, in order to prevent the furrow, which is always so much dreaded in this point, shortens and finishes them as he thinks fit, preserving a piece varying in size according to the extent of vacuum which he has to fill (Fig. 21, *a a'*). Union is afterwards effected by approximating them with one or two interrupted sutures, or with a fine insect pin. If care is taken to place these uniting agents very near the free margin of the lip, the cicatrices will be scarcely visible.[1]

A slight modification of the above operation has been suggested by M. Henry, of Nantes. The chief point of distinction is that the flaps are cut in a slanting direction, from skin to mucous membrane, as will be best indicated by the accompanying diagram (fig. 22).

Fig. 22.

Henry's operation.

M. Mirault, of Angers, employed one flap only:—thus, a flap is taken from above downwards, but left attached to the prolabium (fig. 23, *a*). On the other side of the cleft the margin is completely removed (fig. 23, *b*). The flap *a* is now turned down, and from being perpendicular is now horizontal, and forms the margin of the lip[2] (fig. 24, *a*, *b*).

[1] 'Gazette Médicale de Paris.' 'Prov. Med. Journal,' vol. viii, 1844, p. 260.

[2] 'Dictionnaire de Médicine et de Chirurgie Pratiques,' p. 701.

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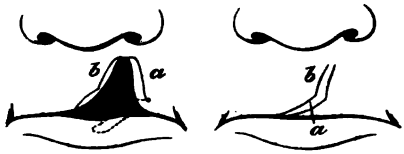
Mr. John Dix refers to a slight modification of this. He remarks that in cutting the flap *a* it should so slope as to take

Fig. 23. Fig. 24.



Mirault's operation.

away more of the skin than of the mucous membrane, and in treating the flap *b* the converse plan should be employed of cutting away a large piece of mucous membrane. In this manner he believes the flaps may more readily overlap.[1]

M. Nélaton[2] devised and practised a simple, and in some cases a useful, procedure, but which is only practicable in cases in which the cleft does not extend into the nostril. It is, perhaps, most serviceable as a secondary operation in instances in which a V-shaped notch has been left. A semicircular incision is made above the fissure, thus (fig. 25):

Fig. 25.

Nélaton's operation.

The fissure is then pulled down, leaving a diamond-shaped wound. One or two needles are then placed across, and the raw surfaces adjusted.

M. Giraldés devised a plan known as the mortise operation.[3] It may be thus described. Supposing the fissure to be on the left side, a flap is made by carrying the knife through the right side of the fissure commencing from below upwards, and is left

[1] 'Costello's Surgery,' vol. ii, p. 815.

[2] 'Med. Times and Gaz.,' July 2, 1859, p. 10.

[3] 'Dictionnaire de Médecine,' p. 703. See also M. Coste, of Marseilles. 'Lancet,' vol. ii, 1851, p. 203.

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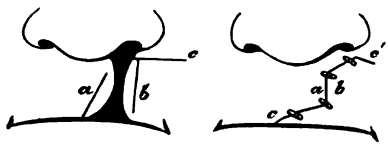
adherent above (fig. 26 *a*). On the opposite side an incision is made in the reverse direction, that is, from above downwards, and left attached by a pedicle at the prolabium (*b*). In some cases

Fig. 26. Figs. 27.



Giraldés' operation.

the flap may be increased by making a transverse incision (*c*), as recommended by Paré, Guillemeau, and Van Horne. The flap *a* is now brought up horizontally, and the flap *b* is brought down, and when united the parts have the appearance represented in fig. 27.

Sédillot suggested a cheilo-plastic operation. The sides of the central tubercles being pared, a flap of soft tissue is taken from each side, as shown in the engraving (fig. 28). The flaps *a a* are brought down to form the red margin of the lip, and the raw surfaces *b b* come in contact with the raw surfaces on the sides of the central tubercle *b' b'*.

Fig. 28.

Sédillot's operation.

Friedberg performed a somewhat similar operation in cases of single harelip.

Dr. Allen Duke proposed an operation by which the skin was not involved. It is thus described by him :[1]—"The edges are pared, not in the usual way, but by an oblique incision from before backwards, slightly concave, and are to be brought together neatly by two or more sutures, each armed by two curved needles, which

[1] 'Lancet,' March 20, 1858, p. 287; and Prof. Soupart's observations thereon, 'Lancet,' July 17, 1858, p. 64.

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are to be introduced immediately under the skin, carried through the remaining thickness of the lip, and firmly tied *internally*. To facilitate the removal of the two upper ones, the ends of the suture should be brought out at the angle of the mouth, and secured externally by adhesive plaster, strips of which are to be applied the more firmly to bring and retain in contact the skin."

Dr. M. H. Collis, of Dublin, speaks thus of an operation,[1] which he calls "the æsthetic treatment:"—"I never throw away a particle of the parings. My incisions are made so as to make every fragment of them useful. On one side they are preserved to make the thick lip, and on the other to increase its depth. The method is somewhat complex, but a reference to the accompanying figures will make it intelligible (figs. 29, 30). When dealing with single harelip, I take the larger portion, that which includes the middle bit, and pare it freely from the nostril round the margin from *a* to *b*, until the point of the knife comes opposite

FIG. 29. FIG. 30.

Collis's operation.

the frænum. This incision goes through all the tissues of the lip *except* the mucous membrane. It follows the curved line of the margin of the fissure, and leaves a long wound, which is curved towards the fissure. The flap is left loose and attached only by mucous membrane. On the other or smaller side of the lip, where we generally find the tissues thin, especially as we approach the nostril, the treatment is quite different. I transfix the lip at *d* close to the nostril; and carrying the knife along parallel to the margin, as far as *f*, I detach a moderately broad flap, which I leave adherent above to the ala nasi, and below to the free margin of the lip well beyond or external to the rounded angle at the fissure. This flap, which (unlike the

[1] 'Dublin Quarterly Journal,' vol. xlv, 1868, p. 296.

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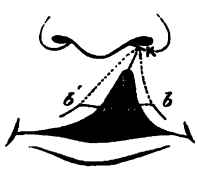
one at the opposite side) comprises *all* the tissues of the lip, is now divided into two at its centre (*c e*). I thus get two loose flaps, a superior (*c d*), attached to the ala nasi, and an inferior (*e f*) hanging on to the free margin of the lip. The loose end of the upper flap is turned up so that its raw surface faces the wound in the opposite side of the fissure, and the lower end of the lower flap is similarly turned down. The point *c* is brought up to *a* and fastened there. The point *e* is brought down to *b* and fastened there. I have thus got on the small side of the lip a wound as extensive as that on the larger side. The upper flap completes the outline of the nostril. The lower one supplements the outline of the free margin of the lip. I thus get a lip nearly double in depth which I could possibly have got by the ordinary incisions."

Dr. Stokes's operation (fig. 31) is a modification of that just described. He says:[1] "I seize the edge of the cleft at its lower extremity with a double hook, draw the parts forward and make an incision through the entire thickness of the lip, taking care however to stop about two or three lines above the red border of the lip. I then make a similar incision on the

FIG. 31.



Stokes's operation.[2]

opposite side. The two points *a'* and *a* can thus be brought down below the red border of the lip, thus forming a projection. The next step consists in making a vertical incision (K B) through the entire thickness of the lip with scissors at the upper angle of the cleft; but this is only necessary in cases where the labial cleft does not extend into the nose. The making of the

[1] 'Dub. Quart. Journal,' vol. l, 1870, p. 4.

[2] In referring to this woodcut it should be remembered that the incisions which go through the *entire* thickness of the lip are indicated by *black* lines, and those which do *not* go through the entire lip are indicated by dotted lines.

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partial incisions at the edge of the cleft on either side constitutes the third stage of the operation. These incisions are made going through fully two thirds or three fourths of the thickness of the lip from the upper point of the vertical incision K down to *b* on one side, and from K to *b'* on the other, and taking care not to injure the mucous membrane. The two quadrilateral flaps K B *a b* and K B *a' b'* can then be turned back, and the broad raw surfaces of each brought into apposition."

Lastly, I may refer to an operation recommended by Mr. Thomas Smith.[1] It is useful, he says, in suitable cases of double harelip. The lateral sides are pared in the manner shown in the fig. 32 *a' a*, and two flaps are taken from the central tubercle, but are not to be detached at their lower margins. "The wound is closed by drawing down the flaps from the side of the central

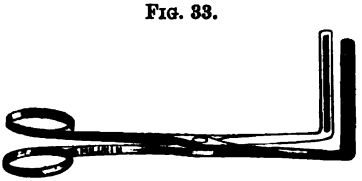
FIG. 32.

T. Smith's operation.

tubercle and attaching them to the raw surface on the lower margin of the lip."

Various instruments have been devised to restrain the hæmorrhage during the operation, and others to keep the parts in apposition in the after treatment. In most of the operations just described the proceedings are somewhat tedious, and in these cases the sides of the lips may be compressed with some

FIG. 33.



convenient instrument made in the form of forceps, such as this (fig. 33)—

[1] 'Lancet,' Dec. 28, 1867, p. 799.

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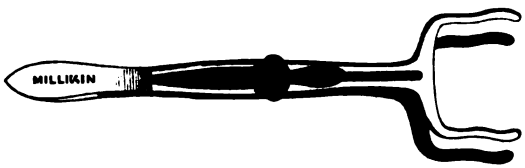
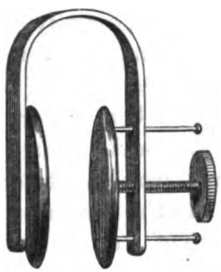
Or this, suggested by Mr. T. Smith (fig. 34)—

Fig. 34.



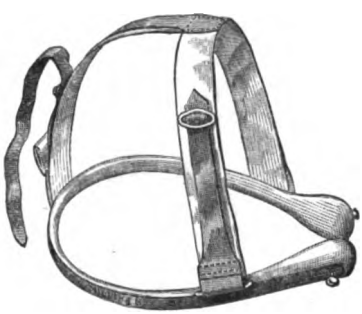
Or by using the lip tourniquet of Mr. Augustin Prichard, of Bristol (fig. 35).

Fig. 35.



Such instruments are, however, scarcely required, provided the surgeon has trustworthy assistants about him. Liston was alive to this point when, in referring to operations on the lips,

Fig. 36.



Hainsby's compressor.

he remarked that "there were many kinds of forceps for holding the lip whilst cutting it, but he advised his pupils always to

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use their fingers. Instruments, many of them, were invented for those whose fingers were useless."[1]

The instrument known as Hainsby's compressor (fig. 36) is in some cases invaluable, but in most instances it may be dispensed with. It is, I think, found to be most useful if worn *before* the operation, so as to bring the sides of the fissure nearer the one to the other and also to approximate the superior maxillæ. The chief drawback of the instrument is that it does not always fit accurately, and in many cases I have observed that as the spring encircles the back of the head it is subject to pressure during the nursing of the child, and hence the cheek pads are apt to get displaced. In Mr. Dewar's paper on harelip, already referred to, he describes an instrument that is somewhat similar in construction, but it is not quite clear from the description (for there is no woodcut) that the spring came from behind forwards, as in Hainsby's instrument. Mr. Dewar speaks thus of the apparatus: "It occurred to me that as a very slight degree of pressure on the cheek on each side near to the corner of the mouth relaxes the upper lip, a narrow piece of steel having a spring, might be so adapted as effectually to answer the purpose. I had a spring made, nearly resembling a pair of sugar-tongs, and so padded as to press upon the cheek near the mouth. It was kept in its place by a narrow tape tied *over the chin*, and by three tapes, which were fastened, one *behind* and *one on each side*, to a piece of leather placed on the crown of the head."[2]

Fig. 37.

Louis's bandage.

Other and more complicated instruments have been devised to support the lip, but, as a rule, a well-applied strip of plaster

[1] 'Lancet,' 1835, vol. i, p. 598.

[2] 'Ed. Med. and Surg. Journal,' 1830, p. 89.

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answers the purpose most efficiently. It should have four ends, and the centre should be narrowed so as not to compress the nose. It is also useful to make small holes in the situation of the points of the needle, so as to avoid pressure on them (see fig. 17), and a pad of lint may be placed on each cheek, so as to give the lip additional support.

I have occasionally used Louis's bandage with advantage (fig. 37). It consists of a double-headed roller about an inch wide, and two yards in length. The centre of the bandage is placed on the middle of the forehead, the two ends are then carried behind the head over the ears to the occiput, where they are made to cross and are brought forward again. Two slits are now made in one end, and the other end split into two. The two ends are then passed through the two slits, and thus by making traction on the ends the edges of the lip are brought together. The bandage is completed by carrying the ends back again to the nape of the neck, and there fastening them. This bandage may be modified to suit particular cases.

I take the opportunity of expressing my acknowledgments to Mr. T. P. Collings for the care and artistic skill which he has exercised in producing the illustrations accompanying this paper.

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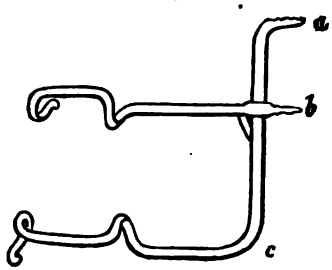
NEW OPHTHALMIC INSTRUMENTS.

By R. LIEBREICH.

1. *A speculum*, without spring and without screw, which by the pressure of the eyelids alone is maintained open at any desired distance and which can be readily released by slight counter pressure of the finger.

Fig. 1.



The instrument is introduced when closed, and the lids are opened by pushing towards each other the two ends *a* and *b*, with the thumb and index finger. In order to take out the instrument push the thumb underneath the angle *c*, and with the nail of the index press slightly on *b*. The same instrument is to be used for both eyes. It occupies far smaller space than the instruments of the kind used hitherto, and is considerably lighter, more durable, and, moreover, very easy to make.

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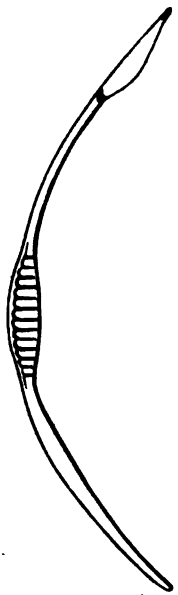
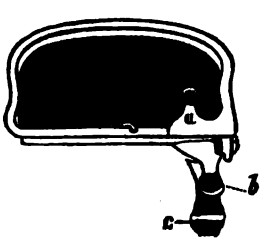
FIG. 2.



2. *A lachrymal knife,* the blade of which is similar to Stilling's, but in addition has a probe end, like Weber's knife, only somewhat shorter and thinner. The handle is formed by a conical probe, which differs from Weber's only in its dimensions. Bowman's operation, as well as Stilling's, can, by means of this instrument, be readily performed by one act, and for myself at least, who am not in the habit of using the graduated probes, it constitutes almost the whole of the apparatus required for the treatment of the affections of the lachrymal sac.

FIG. 3.



3. *Chalazion forceps.*—The ring and plate are not drawn

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together and pushed apart by means of a screw and a spring handle, as has been done hitherto, but work in the same manner as the two blades of a pair of scissors. It embodies the improvement which Knapp introduced into Snellen's forceps. In order to open the forceps press against one another with the tip of the thumb and index, points *a* and *b*. In order to close it press *b* against *c*. This instrument is much smaller and lighter than all former ones, and does not require being held, as it hangs from the lid.

FIG. 4.

4. *Pocket Instrument Case.*—The above figure shows in its natural size a small case containing thirty-eight instruments, by means of which nearly all ophthalmic operations of common

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occurrence can be performed. In the lower half are seen, besides the above-described instruments, a pair of strongly curved scissors, below these a thin square case containing twelve instruments, each of which fits into the same handles near them.

Fig. 5.

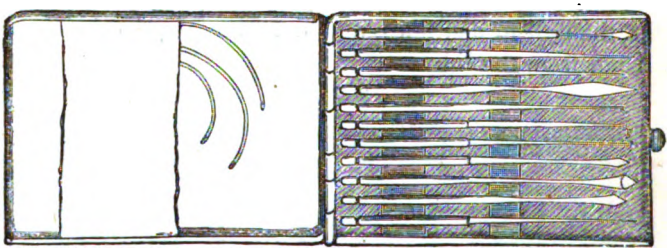

Fig. 5 shows this case open. It contains:

Two discission needles,

One broad needle,

One paracentesis needle (my model, which, having the form of a narrow lance-shaped knife, replaces by an angle the stop piece of the ordinary paracentesis needle),

One hook for extraction of capsule,

One large sharp hook,

One conical probe and one Anel's probe,

Two tattoo-needles of different shapes,

One cystotome,

One instrument for removing foreign bodies.

Each of these instruments can be fitted into the handle, of which however I seldom made use, finding it more convenient to hold the instruments with the tip of the index and thumb only. All the instruments contained in the other part of the case are also to be held with the tip of the index and thumb only. These are—

Three lance-shaped forceps, different breadths, and of the shape and size of fig. 6.

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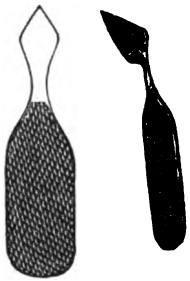
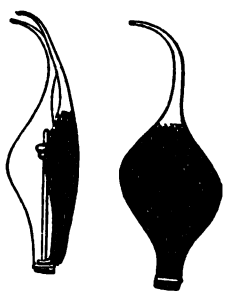
Fig. 6.



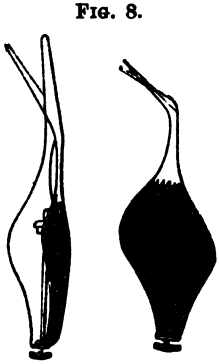
Next to this is found my iris forcep, with the mechanism originally indicated by me, but smaller (fig. 7).

Fig. 7.



It is to be held between the tips of the thumb, index, and middle finger, so that it is opened by the pressure of the thumb and middle finger, closed by the pressure of the thumb and index. The same mechanism is applied to fig. 8.

Fig. 8.



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Three pairs of scissors of different lengths for iridectomy and iridotomy. This side of the case contains, moreover,

Two squint hooks.

Two cataract spoons,

One ciliary forceps,

One straight and one curved hook forceps,

One needle-holder.

These last instruments differ from those generally in use only by their being of a smaller size, and being all specially adapted for holding between the tips of the fingers.

One ordinary forceps, two bistouries, one cataract knife with cystotome are placed at the bottom of the other side; and besides some space is left for china ink, a brush, gelatine discs (atropinized, calabarized, &c.), strips of plaster, sewing silk, &c.

The sewing needles are fastened to a cushion of the small case.

When closed the case is three centimètres high, weighs 4½ ounces, and is therefore easily carried in the pocket.

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ON THE

FUNCTION OF THE VESSELS

IN RELATION TO

THE CIRCULATION OF THE BLOOD.

A THESIS READ FOR THE DEGREE OF M.D. CANTAB.

By F. CHARLEWOOD TURNER, M.D., M.R.C.P.

When John Hunter, in one of his Croonian lectures on muscular action delivered before the Royal Society, first showed, nearly a hundred years ago, that it is a fact capable of experimental demonstration, that the walls of the arteries of animals possess the property of muscular contractility, and that this property is more developed in proportion to the diminution in the size of the vessel, he was led to the inference that this vascular power, while serving to regulate the blood supply to the several parts of the body in accordance with their varying requirements, operates also as an active propulsive circulatory force auxiliary to that of the heart itself.

Hunter points out that, exerted thus, "the muscular power of an artery renders a smaller force of the heart sufficient for the purposes of the circulation; for the heart needs only to act with such force as will be sufficient to carry the blood through the larger arteries, and then the muscular power of the arteries

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takes it up, and, as it were, removes the load of blood while the heart is dilating."

And it is to be observed that an action of the arteries of such a propulsive nature, besides thus tending to diminish the size required for the heart, has, assuming Hunter's theory to be correct, the scarcely less important effect of relieving the arteries themselves from a part of the strain, which the impulse of the ventricular contraction tends to put upon them, an actual strain to which they are found to be only too liable to yield under unfavorable conditions.

The inference drawn by Hunter as to the function of the arteries is supported by the fact that in the lower order of animal organisms, and in the earliest stages of the development of the higher orders, the circulation of the blood is wholly dependent upon such simple rhythmical contractions. It is further aided by a consideration of the magnitude of the potential force represented by the total mass of muscular tissue spread over the whole area of the vascular system. Even in the absence of facts directly suggestive of its action, it would be difficult to contemplate so vast a power remaining passive in relation to the most laborious and essential of the vital functions, in the maintenance of which it is capable, by its organisation, of affording such efficient assistance.

It may be noticed also that to suppose the action of the arteries to be simply regulative, implies a singularity in the function of these muscular organs, as contrasted with that of the muscular tissue generally. For not only do the muscular walls of the hollow viscera perform the double function of propelling, and at the same time adapting their calibre to the volume of, their contents, but the voluntary muscles in like manner, while called into prominent action from time to time by the stimulus of volition, are further employed in the no less important office of maintaining, by means of their continuous state of tonic contraction, that stability and firmness of the body on which the precision of its movement depends.

This large view of the function of the vessels was entertained by physiologists generally for a long period after Hunter's time, and has been quite recently advocated more especially by MM. Legros and Onimus, whose experiments, as

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well as those of Schiff, Claude Bernard, and others, will be adduced as affording the strongest evidence in support of it. In the meantime, however, the difference observed between the character of the contractile movements seen to occur in the striated and in the unstriated muscular fibres, has been regarded as inconsistent with the idea of any consentaneous co-operation between the heart and arteries. This, in conjunction with results of certain experiments apparently tending to the same conclusion, has led many physiologists to take a narrower view of this function, and to regard the action of these vessels as really limited to their regulative influence.

Without venturing to assert that it is capable of absolute demonstration, that the vessels do, as supposed by Hunter, exercise an accelerative influence on the movement of the blood which they transmit—and the question whether the recoil of the arteries to the force of the pulse is, or is not, intensified by a muscular contraction would seem to be incapable of solution by direct observation—it is my object in the present thesis to show that there is a distinct preponderance, in favour of this view, of evidence deducible from known facts and experiments—evidence, in fact, deduced from observations of an apparently conclusive character.

I shall endeavour to show that, while it is open to question how far the difficulty presented by the structural difference between the two kinds of muscular fibre can be regarded as negativing the view here advocated, any inference which might be drawn from the facts apparently most opposed to it, will be found to require material modification, when those facts are examined from other points of view, and in connection with the results of further observations of a parallel nature. It will appear again that other facts, bearing no less directly on the question at issue, go very far indeed to establish the actual existence of the active co-operation insisted upon between the cardiac and vascular forces.

It is urged, indeed, that the deliberate and persistent character, distinctive of the contractile movements of unstriated muscular fibre, while exactly adapted to the simply regulative function of the arteries, is quite incompatible with the possibility of their walls performing rhythmical contractions synchronous with those of the heart, such as are essential to

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their effectual co-operation with the latter in propelling the blood.[1]

The striated muscular fibre, with its orderly rows of separate elements, arranged, as it were, for the immediate distribution of the nervous stimulus throughout the whole mass, and for its simultaneous contraction at every point, would seem indeed to be specially adapted, by such an organisation, to pass from its extended to its fully contracted state with extreme rapidity, in comparison with the unstriated muscular fibre with its simpler structure. On the other hand, it would appear to be equally incidental to the same structural difference, that while the unstriated muscular fibre, in contracting as one mass from its elongated fusiform condition of full extension, has a proportionately very wide amplitude of contractile movement, that of the striated muscular fibre is comparatively limited.

It is manifest how conspicuously adapted such respective properties are, on the one hand, to the rapidity of the impulsive effect of the ventricular contraction (effected by rotation more than by shortening of its walls), and, on the other hand, to the wide range through which the arterial contraction must take place in subserving its regulative function, from its state of maximum dilatation to that of complete occlusion.

But if the arterial walls, from their unstriated texture, are not structurally so well adapted to the performance of free and rapid contractile movements as they would be if striated, and although they may be found to exhibit, in their regulative action, the slow and sustained contractions adapted to that function, there would appear to be no reason to question their capability of performing, under the influence of an appropriate stimulus, rhythmical contractions of a period as brief as that of

[1] In observations on the circulation periodical contractions of the arteries have been noticed, of a character entirely independent of the heart's action, and these have been thought to be capable of exerting an accelerating influence on the movement of the blood. In order, however, that such contractions should produce an effectual acceleration of the circulation, it is a necessary condition that every contraction should be followed by relaxation of the vessel with sufficient promptness to prevent the impediment, which is caused by its continuance, from exceeding its immediate accelerative effect. The deliberate character observable in these movements, and the fact that (according to Schiff) the most noticeable effect due to them is a diminution of the circulation during the period of contraction and *vice versâ*, are scarcely consistent with the supposition referred to.

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the heart's action, and at the same time of sufficient range to exert a very important propulsive force on the movement of the blood; a propulsive influence depending not so much upon a rapid contraction of the vessel at each point (which might require the impulsive action of the striated muscular fibres), as upon the rapid transmission of the contractile movement along the arterial system, with a velocity equal to that of the pulse. Such a contraction following immediately behind each pulse-wave would check the tendency to reflux, by which the first progressional movement of the blood so caused is necessarily succeeded; thus converting what would otherwise be a mere oscillatory disturbance into a series of waves of true progression.

That unstriated muscular fibres are capable of contracting with promptitude and force is known, not only from the rapidity and energy with which the uterus and other viscera are observed to contract under certain circumstances, but from observations on the small arteries themselves in the field of the microscope. Thus MM. Legros and Onimus,[1] when observing the phenomena of inflammation in the web of a frog's foot, noticed that small arteries, in which stasis was just commencing, and which had become distended by masses of blood-corpuscles, not yet coherent together, might be seen from time to time to contract suddenly upon them, scattering them in different directions. This, indeed, does not offer any explanation of the other difficulty, viz. that presented by the persistent character of the contractions of unstriated muscular tissue, as observed under the microscope. But this persistency may be ascribed with as much probability to the nature and manner of action of the nervous stimulus by which it is evoked, as to any quality dependent on the organisation of the muscular fibre itself. When the contraction of a vessel produced by direct irritation, as by the scratch of a pin, or by the application of an irritant fluid, is observed to continue for a considerable time after the application of the stimulus, there is nothing to show that the contraction continues at all longer than the feeling of irritation itself.

But it is maintained that, in addition to the inference from the structure of the arterial walls, there are experimental

[1] 'Journal de l'Anat. et de la Physiol.,' t. 5, 1868.

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facts which support the same restricted view of their functions. Some of these observed facts I will now proceed to consider.

Long ago an experiment was made by Dr. Williams, shewing that under a pressure of from three to five inches of mercury (about equal to the mean value of the blood pressure in the larger arteries as estimated experimentally during life), the fresh defibrinated blood of an ox will pass freely from the mesenteric artery to the hepatic veins of a recently killed dog, through the double capillary system of intestines and liver. This result was held to show that the central forces alone suffice for the maintenance of the circulation, and that no auxiliary vascular force is required for this purpose.

More lately, however, MM. Legros and Onimus,[1] in making more extended observations in the same direction, have shown that warm milk, or a coloured solution of gelatine, will readily traverse the tissues of a still living rabbit, under the comparatively slight pressure of something less than eight inches of the fluid, after the effect of the cardiac force had been removed by ligature of the aorta above the point experimented upon. A result so remarkable these experimenters regard as capable of explanation only on the supposition of its being due to a progressive vermicular contraction of the arteries, continuing independently of that of the heart; and the former result may be looked upon as a less striking instance of the effect of the same contractile force.

At a somewhat later period Professor Volkmann brought forward the results of a series of observations on the variations of the blood pressure in the larger and smaller arteries of different animals, which showed that, in accordance with what he found to occur when fluid is propelled by a regular intermittent force through an elastic tube, there is a gradual diminution of the mean force of the blood stream in its onward course. These results he regarded as proving the limited nature of the arterial action, and the same view has been adopted on similar grounds by Marey and others.

But these experimental results, although according with this view, are not inconsistent with the larger view of the same function, since if, as was before indicated, the wave generated in the large arterial trunks, instead of simply effecting a restora-

[1] 'Journal de l'Anatomie et de la Physiologie,' 1868, p. 370.

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tion of the general arterial pressure (attended by a mere oscillatory movement of the blood, ineffective for its progression) is converted, by the contraction of the arterial walls behind it, in a greater or less degree, into a wave of true progressive movement, transmitted along the expanding column of blood, the motive force of such an expanding wave at each point of its surface will necessarily be diminished at successive points of its advance, in direct proportion to the increased area of the surface over which its effect is distributed, in addition to the loss of impetus due to the frictional resistance offered to its progress. Now, observations on the variation of the mean velocity of the blood in the larger vessels and their branches, show that the expansion of the arterial blood stream is considerable (the mean velocity of the blood in the carotid being estimated as five times as great as that in one of its smaller branches); hence, on this view, a very considerable degree of propulsion of the blood by arterial contraction, is quite compatible with a decided diminution of the mean force of the blood stream in passing from the larger arteries to their branches.

On the other hand, it is manifest that if it should appear that the mean force of the circulation in the smaller arteries may, under favorable conditions, equal, or even exceed, that in the main arterial trunk from which they are derived, such a result, if established as a fact independent of any extraneous influences, would be quite incompatible with the more limited view of the arterial function, and would afford conclusive evidence of their active participation in the propulsion of the blood.

While the greater number of such observations indicate, as above mentioned, a gradual diminution of the force of the blood in its progress, there are not a few showing opposite results. Thus Poiseuille, the inventor of the instrument by which these observations have been made, concluded, as the result of a large number of experiments on various animals, that the force of the circulation was the same in the larger and in the smaller arteries; and Spengler, experimenting with the assistance of Ludwig, found as the result of three out of four series of observations on the horse, that the mean force of the blood in the carotid was exceeded by that in one of its small peripheral branches, by an amount varying from 3·9 mm. to 21·8 mm. of mercury.

Such results tend to support the broader view of the action

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of the vessels, but the great discrepancy between the results obtained by different experienced observers, and by the same observers in different cases, though to be anticipated from the complex conditions of the experiments and the delicacy required in conducting them, seems to prevent any great weight attaching to conclusions deducible from them.

It may be worth noticing, however, that there is one condition of the experiments, which offers some explanation of the disagreement of their results, and which tends to bring the results of some of Volkmann's experiments into accord with those most favorable to the present view.

In comparing the details of those experiments recorded in Professor Volkmann's work, the particulars of which have been somewhat more fully given, it will be seen that the difference in the results arrived at in relation to the question now considered, depends upon the relatively high or low values of the estimates of the minimum blood pressure in the arterial trunk in the different cases.

Thus, in the observations collected from the above source, and arranged in the annexed table,[1] it is seen that, as the difference between the maximum and minimum readings of the instrument taken in the carotid diminishes from 159 mm. to 48 mm., the excess of the corresponding mean estimate of the blood force in the smaller over that in the larger artery diminishes from 31·8 mm. to 0 mm.; and that as this difference further diminishes from 48 mm. to 10 mm., the converse excess of the latter over the former mean estimate increases, with some irregularity, from 0 mm. to 39 mm.

Since it is impossible to suppose that a difference in the amount of continuous strain to be sustained by the arterial trunks of different animals, so great as that here indicated, can accord with the actual fact (the general conditions of the circulation being the same in all), we must look for an explanation of this want of agreement in sources of fallacy incidental to the mechanical conditions of the experiments themselves.

The difficulty in obtaining a true or approximate estimate of the minimum blood pressure in any vessel is referable to the short time allowed for the escape of blood from the instrument in the brief intervals of the pulse; and the error occurring on this account will be greater in proportion (1) to the volume

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of blood to flow back into the vessel, relatively to the calibre of the latter, and (2) to the frequency of the pulse.

Thus, in the series of observations above mentioned, the only experiments in which any considerable variation of the pressure in the carotid was indicated, (a degree of variation corresponding with what is felt by the finger, and with the manner in which the closed end of the main artery is seen to pulsate in amputation wounds, or in which blood is projected in jets from these vessels when wounded), are amongst those made upon the largest

[1] In the following table are included the details of all the experiments recorded in Professor Volkmann's works, in which these are fully given:—

		Max. in carotid.	Min. in carotid.	Fall of mercury in carotid.	Mean in carotid.	Mean in periph. artery.	Diff. between the two means.
A. Splengler on Horse.	1	200·7	42·7	159·	121·7	153·5	+31·8
	2	180·3	41·3	139·	110·8	131·3	+20·5
	3	171·	93·7	77·3	132·3	136·2	+ 3·9
B. Volkmann on Hound. (*7. Spengler on Horse.)	4	200·	146·	54·	173·	173·	+ 0·
	5	206·	158·	48·	182·	177·	− 5·
	6	200·	152·	48·	174·	173·	− 3·
	*7	170·	123·3	46·7	146·6	130·	−16·6
	8	206·	162·	44·	184·	173·	−11·
	9	200·	162·	38·	181·	177·	− 4·
	10	200·	162·7	37·3	181·3	173·8	− 7·5
	11	190·	154·6	35·4	172·3	165·1	− 7·2
	12	206·	174·	32·	190·	169·	−21·
	13	194·	174·	20·	184·	169·	−15·
	14	194·	174·	20·	184·	179·	− 5·
C. Volkmann on Calf.	15	140·	126·	14·	133.	94·	−39·
	16	126·	112·	14·	119·	94·	−25·
	17	126·	112·	14·	119·	93·	−26·
	18	136·	122·	14·	129·	95·	−34·
	19	126·	112·	14·	119·	95·	−24·
	20	136·	122·	14·	129·	94·	−35·
	21	130·	118·	12·	124·	94·	−30·
	22	128·6	116·2	12·4	122·4	94·	−28·4
	23	122·2	110·4	11·8	116·3	89·3	−27·
	24	122·	112·	10·	117·	93·	−24·
	25	132·	122·	10·	127·	93·	−34·
	26	102·	104·	8·	108·	94·	−14·

Taking the mean of the numbers in the above columns for the three sets of observations respectively, we find them to be:—

A. . . .	184·	59·2	124·8	121·1	140·3	+19·2
B. . . .	197·	158·4	38·6	177·7	169·	− 8·7
C. . . .	127·	116·	11·	122·5	93·5	−29·

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animal experimented upon. And in the other cases, while a more or less considerable oscillation of the mercurial column occurred in connection with the larger vessels, its variations were scarcely noticeable in the smaller arteries; and in the carotid and femoral arteries of a horse, Hales found that when the variations of pressure were measured by the oscillations of a column of the blood itself, these were not more than two or three inches in extent in a column of about eight feet. Such experiments give a very approximate value of the maximum force of the blood, but no indication of its minimum value.

If, in the above table of results, we may take the lowest estimate of the minimum blood pressure in the carotid as the closest approximation to its true average value, and substitute this for the values given in the other experiments, these results will be brought into accordance; and, after making a corresponding deduction from the amount of the estimated mean pressure in the peripheral arteries, (a much less considerable deduction being required here, on account of the force of the blood being found to be more equable in them), they will then agree in indicating an excess of the mean force of the blood in the latter over that in the former vessel.

Such an augmentation of the force of the blood stream offers a simple explanation of the fact observed by Ludwig, that when a secretory gland is in a state of functional activity, the pressure of the fluid secretion discharged, as estimated by a hæmodynamometer connected with its duct, may exceed that of the force of the blood in a branch of its afferent artery similarly measured. And in the same manner may be accounted for the fact of the occurrence of profuse excretory discharges when the force of the heart has sunk to its lowest point, or even after it has ceased to beat. Abandoning the hypothesis of "capillary power," as it will be contended farther on that we must do, there appears to be no other explanation of these phenomena of exudation effected in opposition to the osmotic force of the denser organic fluids.

But there is, perhaps, no fact which is more distinctly suggestive of the more limited view of the arterial action, than the remarkable effect observed by Claude Bernard to result from division of the sympathetic nerve in the neck of a rabbit. It might at first seem difficult to understand how the fact, that the

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division of this nerve is followed by an *augmentation* of the freedom and activity of the circulation through the area affected, can be compatible with the supposition that the acceleration of the local circulation should be in any degree dependent on the direct motor influence of any of its fibres on the walls of the arteries. This fact clearly shows, indeed, that the circulation can be actively maintained independently of any such reflex influence upon the vessels, but it does not follow that it is not still dependent on an accelerative vascular action due to the direct stimulus of the heart's contraction, or other influence immediately affecting the arterial walls.

If it should appear, as numerous facts to be subsequently referred to seem conclusively to prove, that the increased activity of the circulation during the period of functional orgasm is brought about through these nerves, not merely by an inhibitory influence on the restraining forces of the sympathetic, but by the proper accelerative effect of a motor stimulus to the vessels, explicable only by a rhythmical contraction of their walls, this would imply, almost of necessity, the continual exercise by them of such a propulsive action on the blood, since it would be difficult to conceive so powerful an agency, called into active exercise under special conditions, and yet not rendered available for the same important purpose under normal conditions, and this more especially when the vessels are continually subjected to a stimulus directly incentive to such an action. Such an effect of the ventricular contraction is suggested by the results of Poiseuille's experiment, who showed that water injected into a portion of an artery taken from a recently killed animal, is driven back with an augmented force; for if the muscular wall of an artery react thus after death to the stimulus of a distending force of fluid, how much more readily and vigorously would the same vessel have responded during life to the quite similar stimulation of the heart's action?

That under such circumstances the restrictive influence on the circulation at any part should, under normal conditions, be in excess of the reflex accelerative influence upon it, is what would be anticipated.

Loven[1] observed that irritation of the sensory nerves in an

[1] Prof. Rutherford, "Lect. on Exp. Physiology," Lect. xii.

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animal, while augmenting the afflux of blood to the area of its distribution, was attended at the same time by a noticeable diminution of the circulation in other parts. A restrictive influence of a local stimulus on the volume of blood circulating in other parts, as is thus indicated, is quite in accordance with its local action, as having an important effect in favouring the local afflux, the object to be attained; and a properly "sympathetic" restriction on the circulation at any point from such a source is indeed the only form of this restrictive influence which can be well understood. The alternative supposition that such a restrictive influence may be brought into play by an excito-motor stimulus derived from the tissue itself seems scarcely tenable. For any effect so produced by the operation of the organic structures proper to the part, must be such as is calculated to maintain its nutritive state; but under no circumstance can it be supposed that this state should be improved by a diminution of the volume of blood circulating through the tissue, and a consequent defect in the renovation of its nutritive juices, except when the consistence of the tissue is impaired by "inflammatory" or simple degenerative processes, in which case an afflux of blood beyond what the weakened tissues can support will embarrass rather than assist its nutrition.

But if the vaso-motor restriction on the circulation at any point is, as now maintained, the expression of the demands of the other parts of the body, the circulation will still be diminished by any local influences operating either by causing the arteries to contract by direct irritation of their walls, or by exerting a depressing influence on the vitality of the tissue, and thus diminishing at once its demands on the blood supply, and the sensitiveness of the nerves by which those demands are transmitted to the vaso-motor centre. Such effects, which are familiar as the result of cold or of the immediate action of stronger chemical or mechanical "irritation," are in no way opposed to the supposition.

It may be maintained, moreover, that we are not without clinical facts suggestive of the exertion of such a restrictive influence on the general circulation by the effect of a local irritation. Where a comparative small area is affected, or where the irritation is not very severe in its character, we should not anticipate that any appreciable effect would be pro-

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duced on the general circulation. We should only expect this to be a marked phenomenon, where a large vascular area has been affected by an irritant of a most active character, causing a great and immediate demand on the supply of blood to the body. In the acutest form of peritonitis we find these conditions most conspicuously fulfilled, in the vast extent of the vascular area simultaneously involved, and in the virulent nature of the inflammatory action set up, and it seems not unreasonable to regard the firmly contracted arteries of the peripheral circulation characteristic of this form of disease, as the effect of the stimulus to this large surface reflected through the vaso-motor centres. And similarly the rigors and chills attendant upon the accession or sudden extension of various local disorders, may be attributed to the effect of a stimulus to excito-motor fibres of the sympathetic system not merely causing, by a vascular relaxation, the determination of a large volume of blood in one particular direction, and so inducing a proportionate depletion of the rest of the body, but, by a restraining influence on the supply to other parts, indirectly favouring the local affluxus—an effect ceasing with the removal of the source of irritation more or less completely, or by its continuance dulling the sensibility of the part to its presence. In the ague fit, again, it is as reasonable to suppose that the malarious poison causes a determination of blood to the viscera, and a secondary contraction of the cutaneous and pulmonary vessels, as to adopt the converse assumption, that the visceral congestion is the secondary result of a supposed effect of the poison on the peripheral circulation.

Thus derived, the actual restrictive influence affecting the circulation at any part of the body, will represent the resultant mean expression of the distributed effects of the individual demands on the general blood supply made by other parts—an influence which would naturally preponderate over the accelerative influence on the circulation at any point in a state of quiescence, unless all parts of the organism should happen to be in the same inactive state.

That the vaso-motor nerves do, as stated above, exert an accelerative, as distinguished from a simple inhibitory influence on the circulation, is evidenced by the results of further experimental observations by Claude Bernard.

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This investigator, in his observations on the influence of the cervical sympathetic and of the chorda tympani on the circulation through the submaxillary gland of a rabbit, not only demonstrated the antagonism in their action, but showed further that the accelerative effect of stimulation of the latter nerve is far greater than can be accounted for by a complete counteraction of the influence of the former. He observed that, although the simultaneous division of both these nerves is attended by a considerable increase of the activity of the circulation through the gland, yet this is much less marked in degree, (*infiniment moins prononcée*) than that resulting from stimulation of the chorda tympani alone.[1]

To account for this direct accelerative influence of the chorda tympani, Claude Bernard suggests that it may be due to an *active dilatation* of the artery by the action of its own muscular walls. This explanation, however, is far from being generally accepted, and would seem to present physical difficulties of an insuperable character. The professor himself, indeed, offers no explanation of the mechanical objection to the view he adopts. The contraction and dilatation of the pupil under opposing nervous stimuli, with which he compares it, presents no analogy to this supposed vascular action, and throws no light upon it. Those who incline to look upon the vessels as important agents in maintaining the circulation by their active contraction, cannot but regard such a result as entirely confirmatory of their views. Further arguments will be subsequently adduced to show that such facts scarcely admit of any other interpretation.

Lastly, the fact has been quite recently mentioned by Professor Buchanan as negativing the idea of a propulsive vascular action, that when the main artery of the limb of an animal is ligatured, there is an instantaneous retardation, or complete arrest of the efflux of blood from the corresponding vein, exposed and divided at the same time.

But if, as the previous facts suggest, the arterial pulse is to be regarded as the natural stimulus determining the arterial contractions, it would be no matter of surprise that the sudden removal of this stimulus should be attended by such a result as the above. That such an arrest is only transitory is shown

[1] 'Lécons de Physiolog. Experim.,' p. 259.

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by the anæmic condition so speedily presented by tissues on the arrival of an embolus in the afferent artery, while the capillary circulation may be seen under the microscope to continue uninterruptedly under similar conditions.

It is contended, then, that the above facts and experimental results—those which appear most distinctly favorable to the limited view of the function of the vessels—are none of them inconsistent with the former view of their action, while the results of parallel experiments, according entirely with this last, are incompatible with the other supposition.

It remains to consider those facts and experiments which tend directly and indirectly to establish the truth of the larger view originally adopted.

It has been pointed out that the influence of some circulatory force, auxiliary to that of the heart, would seem to be necessary to account for the empty state of the arterial trunks generally found after death. A simple tonic contraction of the arteries in the rigor mortis, while propelling the greater part of their contents into the veins, would drive some portion back into the arterial trunks unprovided with muscular walls. To empty these in opposition to the elasticity of their walls, which, as shown by Hunter, tends continually to maintain them in a patulous state of mean dilatation, must require an exhaustive force of some power. Such an auxiliary force would seem necessary also, for the maintenance of the circulation in the presence of such an extreme degree of valvular incompetence in the heart, as is not uncommonly displayed on the post-mortem table. Only lately a case of disease of the pulmonary valve occurred in St. Thomas's Hospital, where one curtain had completely disappeared, and half only of another remained, in which, however, the autopsy showed no marked degree of morbid change in the lungs.

Another fact adduced by Dr. Carpenter, as affording strong evidence to the same effect, is that of the occurrence of an acardiac fœtus of a high degree of development, in which a critical examination showed the inadmissibility of the usual explanation of the maintenance of the circulation of such cases, viz. that it is dependent upon an intimate relation between the circulatory system of the acardiac fœtus, and that of a perfect twin fœtus, by which it is always found to be accompanied.

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Referring to these amongst other facts, Dr. Carpenter has expressed a strong conviction of the existence of some circulatory force independent of, and auxiliary to, that of the heart—not, however, in his opinion, in the form of a propulsive vascular contraction, but of the nature of a "capillary power," dependent upon an attraction of the tissues and the capillaries traversing them for the arterial blood.

Opposed to the view, that such a force can exert any appreciable influence on the circulation, is not only the objection that there are no distinct physical grounds on which it is based, but also the fact that when the circulation is most free and rapid, the blood passes through the capillaries with its arterial character unchanged, and also that its afflux may occur in obedience to a stimulus reflected from a distant part, and may be unattended by any increased activity of the vital function of the organ itself, as when a mental impression occasions an abundant discharge of limpid watery urine.

Other facts more distinctly negative this hypothesis. A well-known experiment shows that any influence of this nature must be due entirely to nervous agency. It is found that, when the head of a frog is suddenly crushed by the blow of a hammer, while the web of the foot is under view in the field of the microscope, the capillary circulation is instantaneously and completely arrested. This result is quite intelligible as the result of a general shock to the nervous system, arresting all the forces of the circulation depending upon it; but a capillary power—dependent upon the physical relation between the tissues and the arterial blood—could not be thus instantaneously arrested in its action, unless entirely due to nervous influence.

But observation shows, on the other hand, that the circulation, so far from being retarded, is, in the first instance at all events, increased in activity, when this nervous influence has been removed, and that the nutritive functions are at the same time rendered more active. At a later period, when the tissue, perhaps under the influence of some irritant, which it can no longer remove by a further increase of the activity of the circulation, loses its tonicity, a consequent relaxation of its vascular channels may offer an impediment to the circulation.

Whether dependent on a "trophic" nervous influence or

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otherwise, the above facts, taken together, tend to show that an attraction of the tissue for the arterial blood has no effect in accelerating its movement.

If, as described by Pflüger, there are fine nerve fibres distributed to the secreting cells of glandular organs, we cannot accept the inference that they exercise a trophic influence on the organ without other facts to support this view; in the absence of any such facts an equally natural supposition, in regard to their function, is that it is sensory or excito-vaso-motor in its nature.

The experiments of Professor Meissner, again, have been thought to indicate the same immediate influence of the nervous system on the nutrition of the tissues. But these experiments, while demonstrating the fact of the dependence of the nutrition of the cornea in the rabbit on the integrity of certain fibres of the ophthalmic division of the fifth nerve, and the further fact of its independence of lesion of the nerves of common sensation of the part, afford no grounds for any conclusions as to the nature of the function actually performed by the fasciculus of sympathetic nerve fibres thus isolated.

The results of these experiments would be just the same, whether this function is, as suggested, the transmission of a centrifugal "trophic" influence to the tissue, or whether it should be found to consist simply in the transmission of a centripetal excito-motor stimulus from the tissues to induce an augmentation of the local afflux by a reflex action of the vaso-motor nerves.

And since experiment shows that in other parts these excito-motor fibres are included in the sensory branches of the cerebro-spinal nerves—Professor Schiff having demonstrated that afflux to the ear of a rabbit is induced by stimulation of the *central* portion of the divided posterior auricular nerve—and since, again, every effect attributable to this supposed "trophic" influence of the sympathetic nerves, can be fully accounted for by the reflex acceleration of the circulation thus exhibited; and since, lastly, as has been pointed out in reference to this question, the nutrition of the organism is initially independent of any such direct stimulus, there appears to be but little foundation for the assumption of this hypothetical nervous agency as a nutritive, or as a circulatory power.

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MM. Legros and Onimus,[1] on the other hand, have published the results of observations, showing that the arteries do actually perform rhythmical contractions, to which the emptying of the arterial trunks after death may be ascribed. Observing under the microscope the circulation in the mesentery of a rabbit, nearly at the point of death, and in which the movement of the blood was becoming arrested, they noticed that, just before its movement finally ceased at any point, the blood continued to advance for some moments by a succession of rhythmical impulses, unequal in force, but at regular intervals, and having no relation to the cardiac or respiratory action; and in a frog, on ligature of the crural artery, they observed that the capillary circulation in the web of the foot, after becoming gradually more and more retarded in its movement, continued to advance in a similar impulsive manner.

Rhythmical contractions of the veins have been often observed, and have been looked upon as propulsive in their effects; but in the case of the arteries, subjected to the distending impulse of the cardiac action, it cannot under normal conditions be determined by observation, whether the recoil which takes place in them is due purely to the elasticity of their walls, or whether this is intensified by a muscular contraction called into play by the same impulse.

The above observations would seem to show the continuance of such rhythmical contractions of the arterial walls after the removal of the natural stimulus.

Such rhythmical contractions of the vessels, if carried beyond the point of mean elastic dilatation, and consequently succeeded by their resilient expansion, would have the exhaustive influence required; and they must be regarded as thus capable of exerting a twofold influence in accelerating the circulation.

Further evidence of this relation of the arterial function to the circulation may be deduced from a consideration of the development, which the muscular coats of the arteries exhibit in so conspicuous a degree, under certain abnormal conditions of the circulatory function.

Where a general arterial and cardiac hypertrophy occurs in the presence of a great increase of the general arterial tension, the arterial hypertrophy may be regarded as due to

[1] 'Journal de l'Anatomie et de la Physiologie,' 1868, pp. 372-4.

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the necessity for an increased power for the regulation of the calibre of the vessels in proportion to the increased pressure of the blood to be held in check.

But cases not very uncommonly occur in which a local arterial hypertrophy of a most marked degree is found unattended by any noticeable degree of ventricular development, and in which, consequently, there can have been little or no augmentation of the general arterial tension. I have been enabled, by the kindness of Dr. Sutton, to examine microscopical specimens from three such cases of Bright's disease, which, without any appreciable degree of hypertrophy of the left ventricle being found, showed a very remarkable degree of hypertrophy of the muscular coat of the arteries in the kidneys, but quite a normal appearance in those of the brain. I have also a note of a case inspected at Guy's Hospital some years ago, in which, with an extreme degree of contraction of the kidney, and great thickening and prominence of the arteries on section of them, there was found a heart weighing only 5½ ounces.

There is little doubt that the determining cause of this arterial hypertrophy is an obstruction to the circulation presented in the capillaries or capillary arterioles. Whether this is due mainly to an increased frictional resistance to the passage of imperfectly depurated blood, or to a diseased state of the walls of the arterioles—diminishing their elasticity, and further, as I should suppose, interfering with their propulsive action on the circulation—or, lastly, to a spasmodic contraction of them from irritation by the blood, an arterial hypertrophy under such circumstances would be quite natural and intelligible as the result of increased efforts of a *propelling* power to overcome an obstacle to its action. And, in relation to their purely regulative function, there would also be a tendency to hypertrophic development of the arterial walls, in proportion to the augmentation of the blood pressure to be controlled. When a general impediment to the circulation throughout the body has led to an augmentation of the general arterial pressure, and to a consequent hypertrophy of the left ventricle of the heart, to an extent so great as the walls of that cavity are sometimes found to be developed, we should expect to find a marked degree of arterial hypertrophy, corresponding to the increase of

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the arterial tension resulting from this combined effect of capillary obstruction and increased propulsion. When, however, the obstruction is over a limited area, too small to affect appreciably the general arterial pressure, we should, in relation to this function alone, expect to find a very much less degree of vascular hypertrophy, the obstruction being in any case only partial. But, in the cases cited above, the arterial hypertrophy is of quite an extreme degree; in one case as great as Dr. Sutton remembers to have seen where ventricular hypertrophy has been present in the highest degree.

But if the occurrence of such cases is incapable of satisfactory explanation, on the supposition of a simply restrictive action of the vessels on the circulation, it is fully in accordance with the supposition of their accelerative action.

If an impediment to the circulation be regarded as the first condition of the morbid process, the defect in the nutritive state of any part affected would have for its immediate effect, under this view, to stimulate the afferent arteries to increased propulsive efforts in order to overcome the obstacle and maintain the required supply of blood—efforts tending to induce a proportionate degree of hypertrophy of their muscular walls. But with an advance of the disease, perhaps by a gradual extension of a process of degeneration of the smallest arteries, the larger vessels, if sufficient for a time to counteract the force of obstruction, will after a longer or shorter period fail to do so; and, when unable to avert the gradual degeneration of the tissues resulting from the deficient blood supply, they would appear in the shrunken organ a witness to the strenuous, if unavailing, efforts to maintain its integrity permitted by the mechanism of its organisation, the degree of the vascular hypertrophy being proportional to the vigour of these recuperative efforts, but bearing no necessary relation to the augmentation of the arterial tension, or to the ventricular hypertrophy to which it is due.

But whatever may be the amount of weight attaching to arguments deducible from such facts as the above, those on which the view of the vascular action now contended for is mainly based, are the results of a number of experiments of a varied and striking character, which seem to prove decisively that the influence of the vaso-motor nerves in augmenting the

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activity of the circulation, cannot be ascribed to a mere relaxation of their restrictive action.

Reference has already been made to the experiments of Claude Bernard on the influence of the nerves on the circulation through the submaxillary gland of a rabbit. These showed him that the vascular activity produced by stimulating the peripheral portion of the divided chorda tympani nerve, was far in excess of that resulting from the vascular paralysis due to section of the cervical sympathetic, and could not, therefore, be referred to an inhibitory action of the former nerve.

The actively accelerating character of this vaso-motor influence is also to be inferred from the results of experiments by MM. Legros and Onimus,[1] on the effect on the circulation of the transmission of a continuous current of electricity down the sympathetic trunk.

Experimenting on the vessels of the web of a frog's foot, in which inflammation had been artificially set up, and at the moment at which stasis was just commencing, they found that while the movement of the blood was quickly arrested, after a transitory acceleration, by the Faradic current, the circulation was, by the application of the galvanic current, re-established at once, and maintained throughout the period of its application.

Applying the same electric current to the sympathetic trunk under normal conditions of the circulatory function, they found (in the ear of a rabbit, in the mesentery of a cat and in that of a rat, and in other animals,) that instead of the general vascular contraction with lowered temperature and diminished arterial tension, which is induced by the Faradic current, the galvanic current induced a dilatation of the vessels, accompanied by a rise of temperature and an augmentation of the arterial pressure.

The same accelerative influence of the vaso-motor nerves may be called into play by less direct stimulation. Animals having had the sympathetic on one side of the neck divided, with the usual effect, have been subjected to various influences —such as those of an anæsthetic, of heat, of blood poisoning, and of emotional excitement—and it has been shown that each may cause the activity of the circulation in the sound ear to reach a point in excess of that in the ear on the injured side.

[1] "Journal de l'Anatomie et de la Phys.,' t. v, pp. 385, 390.

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Claude Bernard[1] having placed a rabbit so treated under the influence of chloroform, found the temperature of the two ears to be, on the right (the side operated upon), 36·8°, and on the left, 37·2°. When taken again, after its return to consciousness, he found that, on the right, the temperature had risen to 37·8°, while on the left it had fallen to 34·4°. In a parallel experiment on a dog, MM. Legros and Onimus obtained results even more striking. The sympathetic having been divided on the left side of the neck, the following temperatures were observed: in the left ear, 34°; in the right ear, 30·5°. Chloroform having been administered, they fell to 24·5° on the left, 27° on the right.

The remarkable fall in the temperature of both sides of the head, here shown, may be ascribed to the depressing influence of the anæsthetic on the circulation generally, and in part perhaps also to a diminution of the production of the bodily heat, through a consequent depression of all the vital functions. In the comparatively slight fall of the temperature on the uninjured side we see, I think, the effect of an acceleration of the circulation through a direct vaso-motor influence on the vessels, an influence called into more prominent action in the presence of the irritating effect on the tissues of the foreign matter taken into the blood, and in the presence also of its depressing influence on the heart, an organ whose high degree of development renders it more readily susceptible to such agents.

The complete removal of all restrictive influences on the circulation through the sound ear, supposing such an effect could have been produced by the anæsthetic, could only have brought the temperature of the two ears upon an equality. That of the sound ear being in excess, must be attributed to an acceleration of the circulation through it by a vaso-motor influence, of which the other side is deprived. The experiments of the same observers, previously mentioned, show that the sympathetic nerve trunks contain fibres capable of affecting this acceleration of the circulation, while other experiments by Professor Schiff, to be subsequently referred to, indicate that the fibres by which this augmentation of the circulation is brought about, are distinct from those exercising a restrictive influence upon it; and that these opposite effects are not due to stimuli to the same nerve fibres, differing only in degree and character, as is

[1] Legros and Onimus, op. cit., p. 377.

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suggested by MM. Legros and Onimus in connection with the results of their experiments.

M. Schiff states that he obtained quite similar results in animals in which he had induced a febrile state by the injection of septic matter. Whether a general septicæmia was produced, or an inflammatory fever secondary to a peritonitis or pleuritis so caused, he invariably found, in numerous experiments, that the temperature of the sound side of the head would rise as much as 2° C. higher than that of the side on which the sympathetic had been previously divided, and that the rise of temperature in the former would more quickly appear, that in the latter being sometimes but little changed.

Amongst the various experiments of this last-named physiologist are some of those which afford the most striking evidences of this acceleration of circulation through the direct agency of vaso-motor nerves — an action which he seems to have been the first to maintain.

Having divided the cervical sympathetic on one side in a rabbit, and demonstrated the vascular injection and elevation of temperature on the corresponding side of the head, resulting from the "passive hyperæmia" (hypérémie névro-paralytique) so induced, Schiff placed the animal in a warm chamber (about 36° C). On removing it after a sufficient interval he showed, that while the vascular injection of the ear on the injured side remained as before, it was manifestly surpassed by that on the sound side; and that while the temperature of the former remained unchanged at 38°, that of the latter had advanced from 32° to 41°.

He met also with a singular corroboration of the same facts in visiting the dog kennels, where the materials for his experiments were kept; observing that when, by a show of partiality to one animal, he engendered feelings of jealousy in others, suffering from the effects of division of their cervical sympathetic on one side, the excitement of the animal produced a hyperæmic state of the sound ear much greater than that continually present in the other. He observed the same effects produced in other dogs by the excitement of the chase.

But perhaps the most remarkable of his experiments[1] in connection with this subject, were those made by him on the

[1] 'Physiologie de la Digestion.' Schiff, t. ii, Appendix.

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jugular appendages of the turkey. The vaso-motor nerves distributed to each lateral half of this organ are found to consist of four fasciculi of fibres given off in succession from the medulla. When all these four are divided on one side, the corresponding half of the erectile organ assumes a bright rose tint, contrasting strongly with the bluish-grey colour of the rest of the organ in its quiescent state; but if the animal be now excited, the contrast is as strong the other way—the permanent rose colour of the injured side paling before the crimson of the perfect half of the organ in its fullest state of active congestion.

The same series of experiments further show that the nerves through which the restrictive and accelerative influences on the circulation are transmitted to the vessels, are quite distinct, though commonly combined in the sympathetic trunk.

By dividing some only of the vaso-motor nerves above mentioned, Schiff found that peculiar and varied results were obtained in different cases: in some cases the injured side of the organ, while as before remaining of a medium rose tint when quiescent, on irritation assumed its full proportions; in other cases, while the organ presented a natural appearance in its quiescent state, the injured side, on excitement, only reached a pink colour when the other was fully congested. In yet other cases a varied effect was produced on the injured side, part having lost its power of retraction and part its power of engorgement.

These striking results show that in this organ the vaso-motor nerves, through which its state of retraction and engorgement are respectively effected, take different courses from the spinal cord to their vascular distribution, and they afford a simple explanation of the opposite effects on the circulation observed by MM. Legros and Onimus to result from the transmission of a Faradic and a continuous current of electricity down the cervical sympathetic, indicating that here also the two sets of nerve fibres, though all mingled in one band, are entirely distinct.

It seems scarcely possible to avoid the inference drawn by Schiff from such facts as the above, namely, that this inversion of the relation between the vascularization of the corresponding parts, which immediately result from section of the sympathetic, is incompatible with the narrower views of the action

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of the vaso-motor nerves. Such a vascular congestion, induced by central or systemic influences—absent only where the influence of the sympathetic has been removed—must necessarily conduct us to the conclusion, that there are contained in the vaso-motor trunks, fibres exerting an immediate accelerating action on the circulation.

It has been maintained, however, that this increased vascular engorgement, produced by vaso-motor influence, may be due to a contraction of the veins by this stimulus.

Such a contraction would produce a distention of the vessels and an increase of arterial pressure, such as is observed to result from the stimulation of these accelerative vaso-motor fibres of the sympathetic, and supposing a concurrent relaxation of the walls of the vessels behind to occur, would be compatible with an augmentation of the volume of blood passing through, but this supposition is not compatible with the simultaneous elevation of the temperature of the part. When the removal of all restrictions on the circulation raises the temperature to a certain point, the supervention of a contraction of the emergent veins cannot cause a still further elevation of it; by impeding the circulation it would rather cause this to fall, in proportion to the degree of obstruction presented.

Schiff, moreover, has been at much pains to give a direct refutation to this idea, by exposing the veins in the ear of a rabbit, and showing that, when active congestion of the part is induced by vaso-motor stimulation, these vessels become uniformly dilated throughout, up to the point of their junction with the jugular.

Other explanations of the above results might be suggested. Can this apparently accelerative effect of the nervous stimulus be really due to a restrictive influence exerted by it on the blood supply to other parts? In the case of a central or systemic stimulus, any such effect indirectly produced would equally affect corresponding parts of the body similarly related to it. Nor, again, can the relatively greater determination of blood to the entire organ, in these experiments, be due to a secondarily occurring retardation of the circulation on the injured side from loss of tonus in the tissue and vessels.

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Such a loss of tonus cannot account for the results of Claude Bernard's experiments, in which the different effects were contrasted on the same organ of the animal at the same time. And in the other experiments, in which the sympathetic had been previously divided, the fact generally noted that the high temperature of the injured side was still maintained at the time of the experiment, is incompatible with the supposition that any loss of tonus can, at this time, have caused an impediment to the circulation.

But admitting with the Florentine Professor, that the remarkable facts observed by him and others are conclusive proof of the direct effects of certain fibres of the sympathetic in augmenting the circulation, this effect has received different explanations from different authorities.

It has been referred to the influence of "trophic" nerves, distributed to the ultimate cellular elements of the tissues.

It was argued above that there are no sufficient grounds for supposing, that the provision of an elaborate vaso-motor system of nerves, by which the supply of nutriment to each part of the body can be varied according to its requirements, is insufficient for the maintenance of the nutrition of the body and the due performances of its vital functions, and that a special stimulus is required to determine those interchanges between the living tissues and the plasm surrounding them, and the attendant molecular actions, in which the vital functions consist. It was also contended that such a "trophic" nervous influence, if existing, could have no appreciable influence on the movement of the blood.

In regard to the experiments now under consideration, it may be further observed that the fact, that the augmentation of the circulation here produced is attended by an increase of the arterial blood pressure—as shown by the tension of the excited vessels and by the rise of the mercurial column of the manometer in MM. Legros and Onimus' experiments—is quite incompatible with a reference of this effect to an attractive circulatory force resident in the capillaries.

It is a fact demonstrated by Bernard, by means of his differential manometer, that a general relaxation of the vessels is attended by a diminution of the pressure in the afferent arteries.

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And this is seen to be a necessary result from the physical condition of the circulation.

The relaxation of the arteries at any point will, by a diminution of resistance they offer to the flow of blood, tend to cause a diminution of the blood pressure in the general arterial system behind, and an augmentation of the blood pressure in front of that point. But in the case of a relaxation of the arterial channels throughout, the chief effect will be due to the diminution of the resistance offered in the smallest arteries, and the result will be to produce a diminution of blood pressure throughout the arterial tract behind, and an augmentation of the pressure in the capillaries and veins in front.

The addition of the influence of an attraction on the blood towards the capillaries could only cause a still further diminution in the arterial pressure, and the same effect would equally result from an "active dilatation" of these vessels.

This same fact, then, is equally incompatible with a reference of the direct vaso-motor acceleration of the circulation to the effect of an "active dilatation" of the vessels, as with a reference of it to a "trophic" influence of the same nerves—an objection independent of the mechanical difficulty involved in the conception of such a vascular action, whether this is regarded as the effects of a power of elongation proper to the muscular fibres themselves, as Professor Pettigrew suggests, and as Claude Bernard would seem to suppose, or whether it is ascribed to the action of forces external to the vascular walls, as suggested by Schiff.

So long, indeed, as the idea of the purely regulative, "stop-cock" function of the arteries is rigidly adhered to, Schiff's hypothesis would seem to be the only one capable of accounting for the results obtained by him. Only by such an extending force from adjacent tissues could a vessel be caused, on this hypothesis, to expand to an extent beyond that assumed, under the same blood pressure, when its muscular walls are completely paralysed.

But if this point is conceded, and the arteries are looked upon as active agents in propelling the blood, the above phenomena receive a complete explanation in every point, and that by a mechanism as simple and efficacious as it is natural and direct.

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For, in regard to the difficulty last mentioned, it is not supposed, on this view of arterial function, that these vessels are paralysed when the sympathetic nerve distributed to them is divided; but that, on the contrary, they are then directly stimulated to increased propulsive efforts by the greater impulse of the fuller pulse waves entering them, and there can thus be no question about a state of maximum dilatation, to be exceeded, under a given degree of blood pressure, only by an "active expansion" of their walls.

And, in regard to the mechanism by which an active determination of the blood may be brought about by stimulation of such a propulsive action of the vessels, it may be observed that, supposing the arteries to be performing rhythmical contractions in a normal manner, a stimulus increasing the vigour of their contractile movements would naturally be attended by some corresponding increase in the degree of relaxation of the vessel from "fatigue," and by an increased distension of the vessels in front by the augmentation of the blood pressure produced. But the effectiveness of the acceleration of the circulation resulting from the excito-motor stimulus by which it is determined, must doubtless be ascribed to a twofold reflex effect produced by this stimulus, in causing a relaxation of the tonic contraction of the vessels concurrently with its influence on their rhythmical action.

Whatever view be taken of the mechanism of the phenomena of afflux, this inhibitory effect of the nervous impression by which it is brought about on the restrictive influences of the sympathetic must necessarily form a prominent feature of it; though, as the above experiments show, one subsidiary to its effect of stimulating the vascular contractions. According to Loven's observations, we may attribute this inhibitory effect to a restraining influence on the circulation in other parts, diminishing to this extent their several reciprocal influences in restraint of the supply of blood to the part affected.

From the above facts, then, I would deduce the conclusions:

1. That while the analogy presented by the known functions of other organs, and those numerous observed facts relating to the vascular system itself, enforce the inference that the vessels do, as originally supposed by Hunter, exert an accelerating influence on the movement of the blood they transmit, by

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means of rhythmical contractions of their walls, there would appear to be no facts on which a valid objection to this view can be founded.

2. And further, that, whereas numerous experiments show there are in the branches of the sympathetic system of nerves motor fibres capable of augmenting the activity of the circulation by their immediate influence on the arteries, the actual phenomena cannot be explained, so as to accord with all the facts, except through the exertion, by these vessels, of a propulsive force upon the blood stream, by means of such rhythmical contractions.

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ON THE USE OF

BELLADONNA IN ENTERIC FEVER.

By JOHN HARLEY, M.D. Lond., F.R.C.P.

What advantages are to be expected from the use of belladonna in enteric fever? is the question which presents itself at the outset of this inquiry, and suggests the need of a proper theory of the action of the drug. This primary question resolves itself into two others, viz. 1, the nature of enteric fever; and, 2, the special action of belladonna in the body. A brief consideration of these will therefore be a proper, if not an altogether necessary, introduction to the main subject.

As to the nature of enteric fever. It will be sufficient for our present purpose to regard it as a general enteritis, accompanied by sympathetic irritation of the lacteal glands and spleen, and commonly associated with more or less pulmonary inflammation —a condition of congestion of the internal viscera,—of dilated blood-vessels and retardation of the blood current amounting at certain points to actual stasis.

As to the action of belladonna. The effects of moderate and oft-repeated doses are as follows:—1, they have a hypnotic and sedative action on the brain and spinal cord respectively; and, 2, a powerful stimulant action on the sympathetic nervous system, as may be demonstrated by the following experiment:—A dog, susceptible of the hypnotic influence of opium, is narcotised by a sufficient dose of morphia for the space of three or four hours. The

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respiration and pulse, which have sunk to a uniform level as soon as narcotism supervened, will be maintained, the first at 14 to 16, and the latter from 65 to 75, a minute, the pulse manifesting a very regular respiratory undulation, rising to 75 towards the end of inspiration, and falling to 65 at the end of expiration. The pupils will be contracted to about $\frac{1}{7}$th. If now the fraction of a grain ($\frac{1}{90}$th) of atropia be admitted under the skin during any period of the narcotic stage, remarkable effects are rapidly developed. The finger which could previously feel the apex stroke of the heart with difficulty, now clearly distinguishes a growing excitement, which in the course of a few minutes becomes evident to the eye as well. A quarter of an hour after the injection, the pulse is nearly trebled in frequency. The cardiac excitement progressively increases, and at the end of three quarters of an hour the heart is seen vibrating against the chest-wall, beating regularly 300 times in the minute, being an acceleration of 234 beats for this brief period. This, the maximum acceleration, is sustained for a while, and the rate then slowly declines, but at the end of four hours the pulse is still accelerated some 24 beats beyond the initial rate. The pupils mean time are widely dilated. Further and in respect of the hypnotic influence of belladonna, the same effects result if the atropia be given at a time when the narcotism has passed off and the animal is readily awakened from sleep; but in addition to the stimulant effects on the sympathetic ganglia above described, the animal again lapses into a state of narcotism. Even when the dose of morphia is double, and that of atropia reduced to half, the same effects are observed. Indeed, as I have shown, opium and belladonna both intensify and prolong each other's effects; and since opium as a means of checking excessive diarrhœa was in many of the cases a necessary adjunct to the belladonna treatment, it is proper that I should call attention to the combined operation of the two drugs. It will be understood, therefore, that the action of belladonna on the body is the same whether it be given alone or in combination with opium, but that in the latter case it is somewhat intensified.

Looking, therefore, to the effects of belladonna in dilating the pupils and exciting the heart, we conclude that the drug is

[1] 'Old Veget. Neurotics,' pp. 107, 275.

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a direct and powerful stimulant to the sympathetic nervous system.

Let us now inquire what are its effects on the blood-vessels. If we observe the small arteries and capillaries during the operation of moderate doses of belladonna, we shall find that they are maintained for hours in a tonic and slightly contracted condition. The blood is equally distributed, and the circulation in any given part is so tight and rapid, that it really contains a little less blood than when in a quiescent state, and the tissue is consequently a little paler, but the quantity that passes through it in a given time is greatly increased. It is to be expected that a drug which is capable of producing such intense excitement will, if given in excessive doses (and these will be still as to quantity very minute), produce exhaustion. This is actually the case; dilatation of the minute blood-vessels and stasis of the blood being the effects of improper doses. As these observations on the use of belladonna in enteric fever were made about seven years ago, and before belladonna juice was admitted into the Pharmacopœia, I may mention that the succus employed was prepared by Messrs. Jacob Bell & Co., in the manner and proportions since prescribed in the Pharmacopœia. The following were the effects of ɱxxx (a dose given to many of the patients whose cases are narrated below), as noted in six healthy adults, male and female. Belladonna action was fully developed in all within an hour, and completed as far as could be determined by any appreciable effects at the end of the second hour. The pulse in one was accelerated only 10 beats; in another, 20; in a third, 26; in two others, 40 beats; and in the sixth (a youth of twenty), the cardiac systoles were more than doubled, the pulse rising from 60 to 140 beats. No effect on the respiratory movements were observable in any. The individual in whom the acceleration of the pulse amounted to 80, did not throughout the 45 minutes during which this the maximum acceleration continued, manifest the slightest disturbance of the breathing. The respiration never exceeded 18; and at the time when the cardiac excitement first reached its acme and afterwards the inspirations numbered 15 or 16, and were natural and easy.

When the patient is taking thirty minims of belladonna juice every four hours for days together, moderate or excessive symptoms (of which active delirium is the chief) are developed ac-

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cording to the age or idiosyncrasy of the patient; and it is never necessary to give this full dose oftener than every six hours. In some cases I have found it necessary to diminish the dose on account of talkative delirium which had evidently been induced by the belladonna; and, as a rule, I find that ℥xv of the succus given every four or six hours is quite sufficient to sustain that moderate atropism which is beneficial. When deliriuin has been present, I have never found this dose increase it, but rather the reverse.

In enteric as in scarlet fever, severe congestion of the kidneys, and attendant albuminuria are not uncommon events. For the prevention or relief of this condition belladonna is the appropriate remedy, for I have shown that the whole of the atropia admitted into the body is eliminated unchanged by the kidneys. If, therefore, the quantity of atropia be not excessive, it follows that an active circulation is maintained in these organs during the time they are engaged in its elimination.

With these prefatory remarks I will now introduce my cases, and will afterwards review the particular effects of the drug, and endeavour to draw some general conclusions as to its use in enteric fever.

CASE 1.—*A severe case with much and persistent diarrhœa from the first; convalescence began on the thirty-eighth day.*

Thomas G—, æt. 19. Had been ill in bed eight days before admission with fever and diarrhœa, six or seven loose stools a day.

Treatment.—He took ℥xxx Succi Belladonnæ sextis horis from the ninth to the thirty-fifth day, and occasional doses of opium.

Progress.—During the second week the diarrhœa was profuse and there was slight nocturnal delirium. On the fifteenth day there was vomiting. On the thirty-eighth the stools became solid and natural, and convalescence commenced, and was effected without interruption.

9th day.—℥xxx *Succi Belladonnæ, sextis horis.* Restlessness; slight delirium at night; several loose stools; no rash; tongue fissurally ulcerated, moist. Temperature 104.° Pulse 112. Such was the condition before the medicine was given.

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10th.—mv *Tincturæ opii* with each dose of Belladonna. Much diarrhœa last night; tongue dryish. T. 100·4°. P. 84.

11th.—Gr. x *Pilulæ saponis co.*=gr. ij *Pulveris opii.* Slept after the additional opium; great dryness of the mouth and thirst; belly retracted, one rose spot, one loose stool. T. 100°. P. 100.

12th.—Two loose stools last night; skin and tongue dry. T. 102·6°. P. 80.

13th.—Two loose stools last night; tongue clean and moist, cracks contracting; pupils ½; brighter, and said he was better and hungry. T. 99·2°. P. 96.

14th.—mxx *Tincturæ opii* as an enema. Several loose stools. T. 100°. P. 92.

15th.—Gr. i *Pulveris opii.* Bowels quiet; tongue dry. T. 100°. P. 96.

Evening.—Much abdominal pain; vomiting. T. 100°. P. 112.

16th.—One stool; tongue dry down the centre, with deeply ulcerated fissures; mind tranquil. T. 100·4°. P. 84.

Evening.—T. 101·2°. P. 84.

17th.—Bowels quiet; felt comfortable. T. 100·4°. P. 84.

18th.—*Pulveris opii* gr. i, *sextis horis.* Bowels loose last night. T. 100°. P. 84.

19th.—Bowels quiet. T. 99·2°. P. 80.

20th.—Two loose stools. T. 99·2°. P. 78.

21st.—Bowels quiet; asked for food; tongue moist. T. 99°. P. 72.

22nd.—Omitted the opium. One loose stool. T. 99·4°. P. 72.

23rd.—Two loose stools last night; tongue clean, fissured. T. 99·4°. P. 72.

24th.—No action of the bowels. T. 99°. P. 84.

25th.—No action of the bowels; abdomen thin and tense; a little uneasy in breathing; tongue moist and clean; the cracks healing. T. 99·2°. P. 84.

26th.—Bowels open twice; abdomen softer, still a little uneasy in breathing; tongue clean and wet. T. 97·4°. P. 72.

27th.—Two loose stools. T. 98·2°. P. 80.

28th.—Two loose stools. T. 98·6°. P. 72.

29th.—*Pulveris opii* gr. i, *sextis horis.* Four loose stools since yesterday; tongue clean and moist; cracks nearly healed; great hunger. Temperature 98·8°. Pulse 92.

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30th.—Omitted the opium. Two loose stools. T. 99.° P. 72.
31st.—*Enema opii* = ℥xx *Tincturæ opii*. Six loose stools; appeared bright and well. T. 97·8°. P. 76.
32nd.—No action of the bowels. T. 99·2°. P. 76.
33rd.—No action of the bowels. T. 98·8°. P. 72.
34th.—Two moderately loose yellow stools. T. 99°. P. 104.
35th.—*Haustus cinchonæ* in place of the belladonna. No action of the bowels; tongue and abdomen natural, and the patient was bright and comfortable.

CASE 2.—*A severe case with prostration; the treatment adopted in the mid-career of the disease. It was probably the thirty-fourth day before convalescence began.*

Catherine P—, æt. 11, admitted August 11th, duration of illness uncertain, chief symptoms fever and diarrhœa.

Treatment.—She took ℥xv Succi belladonnæ from the first to the eighteenth day of her sojourn in the hospital, and from the second day took six ounces of wine daily.

Progress.—Excessive prostration was the chief feature of this case. Belladonna was given from the fourteenth (?) to the thirty-third day. Bronchitis threatened on the tenth day of treatment; the prostration was greatest on the twelfth. From this time she began to improve, and on the eighteenth day of treatment convalescence was established and recovery was rapid.

August 11th.—℥xv *Succi belladonnæ, quartis horis.* Hot poultice to the abdomen. Prostrate, apathetic, pale, and emaciated; respiration frequent, with sighing and moaning; teeth dirty with sordes; tongue dry, brown; abdomen full and hard; bowels loose; sickness. Temperature 104°. Pulse 128.
12th.—Six ounces of wine. Great prostration. T. 104°. P. 130.
13th.—Retention of urine; bowels loose. T. 104°. P. 130.
14th.—Mouth dry and black with sordes; bowels quiet. T. 101°. P. 120.
15th.—No action of the bowels. T. 101·4°. P. 120.
16th.—No action of the bowels; condition much the same. T. 100·4°. P. 108.

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17th.—Two loose stools. T. 102·2°. P. 108.

18th.—Two loose stools. T. 100·2°. P. 120.

19th.—Abdomen soft; sordes moistening. T. 98°. P. 116.

20th.—Mucous râles over the bases of the lungs; restlessness. T. 98·2°. P. 120.

21st.—Very apathetic still; mouth still black with sordes; bowels not open. T. 101·2°. P. 116.

22nd.—Prostration extreme, nearly unconscious, slipping down in the bed, and rolling the head from side to side. T. 107°. P. 112.

23rd.—Less restlessness. T. 98·6°. P. 120.

24th.—Bowels open once, the first time for five days, stool solid; sleep less disturbed. T. 98·6°. P. 120.

25th.—Consciousness returning; gave an answer for the first time; tongue moistening; sordes disappearing. T. 98°. P. 116.

26th.—Improving. T. 98·2°. P. 116.

27-8th.—℥j *Olei ricini* each day. Much improved; bowels had not acted for four days. T. 98°. P. 116.

29th.—Substituted *Haustus cinchonæ* for the belladonna. The oil acted to-day, giving two stools, the first nearly solid, the second rather loose; greatly improved; lay on the side, looking bright and cheerful; mouth clean and moist. Temperature 98·2°. Pulse 88.

CASE 3.—*A moderate case and early convalescence.*

Esther L—, æt. 16. Had been ill seven days before admission with sickness, diarrhœa, and abdominal pain.

Treatment.—From the seventh to the twelfth day she took ♏x Acidi sulphurici diluti cum ♏v Tincturæ opii; thence forward to the twenty-fifth day Succi belladonnæ ♏xv, cum Tincturæ opii ♏v, quartis horis.

Progress.—Nervous symptoms were absent in this case. Improvement began on the twelfth day, and continued without interruption until the twelfth day of the belladonna, the twenty-fourth of the disease, when convalescence was established.

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8th day.—*Haustus acidi sulphurici et opii.* Tongue dry and fissured; abdomen tense and painful; three loose stools; rose rash. T. 103°. P. 120.

12th.—ℳxx *Tincturæ belladonnæ*, ℳv *Tincturæ opii, quartis horis.* Continued in the same state, the temperature varying from 103° to 102°; and the pulse from 102 to 104.

13-17th.—Tongue still dry; voice husky; abdomen natural; rash faded; one loose stool every day. Temperature varied from 102·3° to 99°; and the pulse from 104 to 96.

19th.—Improved; tongue dryish, the cracks healing; somnolency; no action of the bowels the last two days. T. 99°. P. 84.

22nd.—One moderate, consistent, yellow stool; tongue moist, clean, and pink; bright and cheerful. T. 98°. P. 80.

24th.—Belladonna and opium discontinued. Tongue and abdomen natural; convalescent. Temperature 98°. Pulse 80.

CASE 4.—*A mild case, convalescence on the twenty-fifth day.*

George W—, aged 22. Had been ill fourteen days before admission with headache, anorexia, and fever.

Treatment.—He took ℳxxx Succi Belladonnæ, quartis horis, from the seventeenth to the thirtieth day.

Progress.—The symptoms declined in severity from the day of admission.

14th day.—*Haustus acidi sulphurici et opii.* Bowels loose; tongue moist, with red edges. T. 102°. P. 110.

17th.—ℳxxx *Succi belladonnæ, quartis horis.* Continued in the same state; numerous rose spots and bluish blotches; bowels loose. T. 100°. P. 90.

18th.—Bowels quiet. T. 98°. P. 72.

19th.—Fresh rose spots; bowels quiet. T. 98°. P. 72.

20th.—Bowels quiet. T. 97·8°. P. 60.

21st.—Bowels quiet. T. 98·2°. P. 72.

22nd.—Bowels quiet. T. 98·6°. P. 60.

23rd to 29th.—Continued to improve; motions become consistent; convalescence. During these days the temperature ranged from 98·6° to 97·6°, and the pulse from 80 to 60.

30th.—Belladonna discontinued. The patient left his bed.

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CASE 5.—*A moderately severe case, hæmorrhage on the seventh, convalescence on the twenty-fourth day.*

Esther P—, aged 20. Had been ill a week before admission with headache and looseness of the bowels.

Treatment.—She took ℥xxx Succi belladonnæ, quartis horis, from the seventh to the eleventh and from the fourteenth to the twenty-second day.

Progress.—There was constipation from the seventh to the eleventh day, when there was hæmorrhage. Convalescence began on the eighteenth day of the disease. With an interruption of two and a half days the belladonna was given during sixteen days.

7th day.—℥xxx *Succi belladonnæ, quartis horis.* Abdomen full and hard; several rose spots; tongue dry and cracked; restless; delirium at night. T. 103°. P. 120.

8th.—Bowels quiet. T. 102·6°. P. 120.

9th.—Bowels quiet. T. 103°. P. 120.

10th.—Poultice to the abdomen. Bowels not acted since admission; abdomen tense; tongue dry and brown. T. 101·6°. P. 108.

11th.—Substituted *Haustus terebinthinæ* in the evening for the belladonna, and gave ℥xx *Tincturæ opii* as an enema. Bowels quiet all day, but in the evening there was hæmorrhage, estimated at half a pint. T. 102·2°. P. 132.

12th.—Bowels quiet. T. 103°. P. 124.

13th.—A loose stool, but no trace of blood. T. 99·1°. P. 116.

14th.—Omitted the turpentine and resumed the *belladonna.* Bowels open once; tongue moist and cleaning. T. 99·4°. P. 112.

15th.—Bowels open once. T. 100°. P. 108.

16th.—No action of the bowels. T. 98°. P. 96.

17th.—No action of the bowels; tongue natural. T. 98·2°. P. 88.

18th to 23rd.—Discontinued the belladonna on the twenty-second day. Comfortable, cheerful, and very hungry; the temperature and pulse retaining their normal character; convalescence was rapid.

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CASE 6.—*An ordinary case with early prostration. Convalescence on the twenty-second day.*

Robert H—, aged 63. Had been ill three days before admission with general pains, much thirst, and looseness of the bowels.

Treatment.—He took ℥xxx Succi belladonnæ, quartis horis, from the fourth to the twentieth day.

Progress.—Diarrhœa ceased on the twelfth day of treatment. There was much complaint of a bitter taste as long as the belladonna was continued.

4th day.—℥xxx *Succi belladonnæ, quartis horis.* Tongue dry and brown; great prostration; three loose stools. T. 100·8°. P. 84.

5th.—T. 100·8°. P. 84.

6th.—Tongue unchanged; six loose stools in the night. T. 99·2°. P. 84.

7th.—Bowels quiet. T. 100·8°. P. 76.

8th.—Tongue moistening at the edges; no action of the bowels; said he was much better. T. 98·6°. P. 76.

9th.—Tongue still dry; bowels open once. T. 99°. P. 72.

10th.—Five loose stools last night. T. 99°. P. 72.

11th.—Tongue dryish and cracked in the centre, moist and clean elsewhere; abdomen natural; said he was very comfortable. T. 100°. P. 80.

12th.—Bowels loose. T. 98·4°. P. 84.

13th.—℥xx *Tincturæ opii,* as an enema. Tongue quite dry; several loose stools. T. 99°. P. 108.

14th.—Bowels quiet. T. 99·4°. P. 72.

15th.—Bowels quiet. T. 99·6°. P. 72.

16th.—Bowels quiet. T. 99·8°. P. 84.

17th.—Improving; the cause of the increased pyrexia on this and the following day was not obvious. T. 103·6°. P. 120.

18th.—T. 103·6°. P. 120.

19th.—T. 98·2°. P. 72.

20th.—Discontinued the belladonna. Much improved; tongue clean. T. 98·2°. P. 72.

21st.—Bowels had acted to-day, the first time for five days, stool solid; convalescence was uninterrupted from this date. T. 98·2°. P. 72.

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22-26th.—During these days the temperature ranged from 98·6° to 98·2°; and the pulse from 80 to 48.

CASE 7.—*A severe case. Hæmorrhage on the fifteenth, eighteenth, and nineteenth days. Convalescence began on the twenty-seventh day.*

John G—, æt. 24. Had been ill seven days before admission with headache, continued diarrhœa, and general pains.

Treatment.—He took ℥xxx Succi belladonnæ cum tincturæ opii, ℥v sextis horis, till the evening of the twentieth, when, on account of the hæmorrhage, turpentine was prescribed instead.

Progress.—Insomnia; restlessness and moderate nocturnal delirium marked the earlier days of the disease. Great relief followed the hæmorrhage on the fifteenth day. An increase of pyrexia attended the second bleeding on the eighteenth day. An eruption of sudamina appeared on the twentieth, and thenceforward the progress towards recovery was rapid.

8th day.—℥xxx *Succi belladonnæ et* ℥v *Tincturæ opii, sextis horis,* in addition ℥xv *Tincturæ opii* to-night. Tongue dry; abdomen rather full and hard; very restless; insomnia; rash abundant. T. 104·4°. P. 120.

9th.—Several loose stools. T. 104·4°. P. 96.

10th.—Rash very copious and large. T. 103·6°. P. 108.

11th.—℥xx *Tincturæ opii* as an enema. Diarrhœa continued. T. 104·2°. P. 120.

12th.—Bowels still loose; tongue covered with yellow fur; insomnia.

13th.—Repeat the *Enema opii.* Bowels still loose. T. 103·2°. P. 96.

14th.—Sedative = ℥xv *Tincturæ opii.* Slight delirium; abdomen tense; much sweating; tremor of the lips and hands; numerous fresh spots; two loose stools. T. 102·4°. P. 92.

Evening.—Continued restless all day. T. 102·2°. P. 130.

15th.—Four loose stools, each with blood; amounting in all to a considerable quantity. Fresh spots. T. 102°. P. 96.

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Evening.—Substituted turpentine draught for the belladonna; *Enema opii.* Tongue moist; one stool with a tinge of blood; skin cool. T. 100°. P. 80.

16th.—Bowels not open during the previous night, but thrice to-day, without blood; tongue moist and red. T. 102°. P. 96.

17th.—Brandy ʒiij. Weaker, but comfortable; tongue moist. T. 101·4°. P. 92.

18th.—Bowels open twice; about half a pint of dark blood in last stool. T. 104°. P. 100.

19th.—Two loose stools, tinged with blood. T. 102·6°. P. 108.

20th.—*Enema opii.* Four loose stools, with slight tinge of blood; a few new spots; eruption of sudamina; tongue moist and clean; slept well; abdomen rather full. T. 102·8°. P. 104.

21st.—Bowels open once; no blood. T. 102°. P. 100.

22nd.—Three loose stools. T. 101·4°. P. 104.

23rd.—One stool, more consistent. T. 100·8°. P. 92.

24th.—One dark bilious, more consistent stool to-day; tongue moist and nearly clean; comfortable and cheerful; convalescence was uninterrupted. T. 101·2°. P. 92.

CASE 8.—*A moderately severe case, with early prostration. Convalescence began on the twentieth day.*

James M—, æt. 6. He had been ill seven days before admission, with fever and diarrhœa.

Treatment.—mxv Succi belladonnæ, sextis horis, from the eighth to the twenty-seventh day.

Progress.—There was great pallor and apathy throughout. The diarrhœa and prostration were relieved on the eighth day of treatment. On the twentieth day there was hunger. From this date the motions became consistent, and on the twenty-seventh day the evacuations were natural.

8th day.—Restless; pallid; tongue dry and brown; three loose stools. T. 103°. P. 130.

9th.—mxv *Succi belladonnæ, sextis horis.* A few rose spots. T. 103°. P. 130.

10th to 16th.—Prostration with restlessness, and from two to four loose stools a day. T. 103° to 100·5°. P. 130 to 120.

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17th.—Progress gradual; now much improved; sat up in bed; tongue clean and moistish; one loose stool a day since the fifteenth. T. 99·2°. P. 120.
18th.—T. 103·2°. P. 120.
19th.—Intelligence returned; tongue clean and moist. T. 97·8°. P. 100.
20th.—Convalescing. Only one stool during the last two days. T. 98°. P. 108.
23rd.—Still improving. One moderately loose stool. T. 98°. P. 96.
24th.—One consistent stool. T. 97·2°. P. 100.
26th.—Belladonna discontinued. A natural stool; convalescence rapidly completed from this date. T. 97·2°. P. 96.

CASE 9.—*The abdominal symptoms were severe during the second week, but convalescence was unusually early, beginning on the eighteenth day and continuing without interruption.*

Alice H—, æt. 20. Had been ill nine days with fever and diarrhœa before admission.

Treatment.—She took ℥xxx Succi belladonnæ, quartis horis, from the eleventh to the twenty-third day, and on the eleventh day an opiate enema was required.

Progress.—Beyond a little restlessness and nervousness during the first week, there were no nervous symptoms. Convalescence began on the eighteenth day.

10th day.—Abdomen full and tender; no decided rash; three loose stools; tongue dry anteriorly. T. 104°. P. 120.
11th.—℥xxx *Succi belladonnæ, quartis horis;* ʒx *Tincturæ opii* as an enema. Several loose stools; respiration nervous. T. 104°. P. 120.
12th.—Tongue glazed; face flushed. T. 103·4°. P. 100.
13th.—Three loose stools. T. 105°. P. 92.
14th.—Abdomen still full and rather tense. T. 99°. P. 80.
15th.—One loose stool to-day; belly soft. T. 98·4°. P. 88.
16th.—Two loose stools to-day. T. 98°. P. 80.
17th.—One stool; tongue clean and moist; convalescing. T. 98°. P. 80.

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18th to 23rd.—Discontinued the belladonna. During these days convalescence was uninterrupted; there was no action of the bowels for the first three days, but one natural stool each day since. Now bright and hungry. T. 99° to 98·2°. P. 96 to 68.

CASE 10. — *A case of moderate severity, accompanied by prostration and catarrhal symptoms with sweating. Convalescence began on the twenty-seventh day.*

John M—, æt. 18, had been ill thirteen days before admission, with headache, anorexia, and diarrhœa.

Treatment.—He took ℥xxx Succi belladonnæ, quartis horis, from the fourteenth to the thirty-first day, combined with ℥v Tincturæ Opii, from the nineteenth to the twenty-third day.

Progress.—Profuse sweating set in on the fourth day of the belladonna treatment, and continued with intermissions of a few hours during the next nine days. There was general relief on the tenth day of treatment.

14th day.—*Haustus acidi sulphurici et opii.* Very prostrate and apathetic; tongue dry and glazed; bowels loose. T. 103°. P. 96.

15th.—℥xxx *Succi belladonnæ, quartis horis.* Omit the former medicine. T. 103°. P. 100 before the belladonna.

16-17th.—Continued in the same general condition. T. 100·4°. P. 72.

18th.—Tracheal cough; considerable sweating. T. 97·6°. P. 56.

19th.—Add ℥vi *Tincturæ opii* to each dose of belladonna. Slight bronchitis; bowels still loose. T. 102°. P. 76.

20th.—Great prostration; bowels moderately loose. T. 101·6°. P. 72.

21st.—Apathetic; tongue dry, with wide moist edges. T. 101·2°. P. 72.

22nd.—T. 100°. P. 72.

23rd.—Discontinued the opium and took ℥xxx *Succi belladonnæ* alone every six hours. Improved; drowsy; bathed in sweat; respiration 12; abdomen natural; no action of bowels for two days. T. 93·6°. P. 56 to 48.

24th.—One loose stool. T. 101·4°. P. 88.

25th.—T. 99·2°. P. 52.

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26th.—Much brighter; tongue clean and moist. T. 98·2°. P. 60.

27th.—"Felt very well." Profuse sweating; tongue clean and moistish. T. 98°. P. 64.

28th.—A solid stool. Hunger. T. 101°. P. 80.

29th.—A solid stool. Hunger. T. 99·8°. P. 84.

30th.—A solid stool. Hunger; sweating continued. T. 99·8°. P. 84.

31st.—Belladonna discontinued. Convalesced from day to day; stools natural. To-day took solid food; the sweating ceased, leaving the skin naturally moist. T. 100° to 98·4°. P. 68 to 54.

CASE 11.—*A severe case during the first fortnight, but convalescence was rapid, beginning on the twentieth day.*

Marianne H—, æt. 19. Had been ill several days before admission with fever and diarrhœa.

Treatment.—She took ℥xx Succi belladonnæ cum ℥v Tincturæ opii from the eighth to the twenty-second day.

Progress.—There were diarrhœa, much stupor, and quiet delirium until the fourteenth day, at which date bile reappeared in the stools, and desire for food returned.

8th day.—*Succi belladonnæ* ℥xx, *Tincturæ opii* ℥v, *quartis horis.* Delirious; tongue dry; abdomen tender; rose rash; four loose stools. T. 104°. P. 125.

13th.—Had continued in much the same condition; fresh eruption; moderate diarrhœa; abdomen now tense and tender; tongue dry, glazed, and contracted. T. 104° to 101·5°. P. 120 to 98.

14th.—Four loose stools; a dry, tracheal cough. T. 100°. P. 98.

15th.—Much improved; two loose stools; abdomen natural; tongue moistening, and epithelium separating. Asked for an egg. T. 100°. P. 95.

18th.—Continued improvement; one loose, bright yellow stool each day; tongue moist at edges. T. 98°. P. 80.

20th.—Convalescing. T. 97°. P. 72.

32nd.—Omit the mixture. Tongue natural; two yellow semi-solid stools. Rapid convalescence. T. 98°. P. 80.

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CASE 12.—*A severe case, complicated with broncho-pneumonia. Convalescence began on the thirty-second day of her sojourn in the hospital, probably about the fortieth day of the disease.*

Emily C—, æt. 5, admitted, on an unascertained day of fever, with great pyrexia; pulse 132, tongue dry, abdomen full, profuse diarrhœa, and indications of general broncho-pneumonia moderately developed.

Treatment.—For the first sixteen days she took ɱxxx Succi belladonnæ, quartis horis, with occasional doses of senega and ammonia; and the next seven days the same dose of belladonna every six hours. Poultices of linseed and mustard were continually applied to the chest during the prevalence of the bronchial symptoms.

Progress.—On the twelfth day after admission there was fully developed bronchitis, diffused through both lungs, with harsh crepitant inspiration and a troublesome dry cough. During the next few days there was very copious frothy expectoration. On the seventeenth day there was great amelioration, the cough and expectoration were much diminished, the pulse was 98, and the tongue clean and moist. The improvement continued over the twenty-first day, when the pulse was 92. A slight increase of pyrexia followed, which gradually declined, and on the thirty-second day after her admission she was convalescent. The enteric symptoms were moderate, the stools continued loose and ochre-coloured to the twenty-third day, but the motions never exceeded three in the twenty-four hours.

The average daily rate of the pulse was 109. After the first four doses of the belladonna it was reduced to 100, and at the height of the pyrexia it numbered during two days (the twelfth and thirteenth) 132.

On the twenty-sixth day the tongue was clean and moist, and the motions hard. The pupils were widely dilated throughout, but there was neither delirium nor insomnia.

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CASE 13.—*A case of moderate severity and early convalescence.*

Charlotte Y—, æt. 12, admitted on the seventh day of fever, suffering general pains; bowels loose; face flushed; dorsal decubitus; moderate pyrexia; pulse 120; tongue moist, coated, cracked at the centre.

Treatment.—She took ɱxxx Succi belladonnæ, sextis horis, from the seventh to the fifteenth day, and ɱxv, sextis horis, from the fifteenth to the twenty-first day.

Progress.—The condition was typhous[1] for five days after admission; the tongue was cracked; the abdomen moderately distended, and there was moderate diarrhœa. On the evening of the twelfth day, the rose spots were faded, and she passed, in a stool chiefly fluid, a small quantity of soft almost formed fæcal matter of natural colour. From this time there was no diarrhœa. On the fourteenth day there was a great improvement, and on the seventeenth she lay on her side and complained of hunger. On the nineteenth day the pyrexia was absent, and on the twenty-second she was convalescent, the bowels were acting naturally, and she took fish. She left the hospital on the thirty-third day.

Analysis of symptoms.—There was moderate delirium during the ninth, tenth, and eleventh days, when the abdominal disease was most urgent. The tongue became moist and was clean on the fourteenth day. The daily average of the pulse from the day of admission to the day of convalescence was 100. It fell to 108 on the eighth day, and again attained its maximum 120 on the twelfth, and thenceforward declined.

CASE 14.—*A case of moderate severity. Death from inanition and exhaustion on the thirty-eighth day. Cicatrization of the intestinal ulcers.*

Catherine M—, æt. 30, a spare, weakly woman, the mother of Ellen (see Case 24), was admitted on the fourth day of a febrile attack, which began with rigors, headache, and pains in the limbs. A few rose papules appeared on the sixth day, when the tongue was dry, brown, and cracked. Next day there was

[1] Sordes, severe prostration and pyrexia, dorsal decubitus, delirium, and a parched tongue.

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a plentiful crop of rose rash, sordes on the teeth and tongue, and considerable pyrexia and prostration. The stools were still formed, and the bowels rather confined.

Up to this, the sixth day, she took acetate of ammonia, and the daily average of the pulse was 117.

Treatment.—She took ℥xv Succi belladonnæ, sextis horis, from the seventh to the thirty-fifth day; and from the twelfth to the twenty-sixth day gr. j, Opii (pilulæ saponis compositæ gr. v) in addition.

Progress.—The rash continued to appear until the eighteenth day. She had moderate diarrhœa (from one to three watery stools in the twenty-four hours) from the seventh to the twenty-eighth day. The daily average of the pulse from the seventh to the thirty-third day was 113. On the thirty-third day convalescence had seemingly begun, the pulse was 112, and she was impatient for meat. On the thirty-fifth day, after non-action of the bowels for five or six days, a simple enema brought away a soft and natural motion. On the thirty-seventh day she took fish and enjoyed it, but the stomach did not retain it; the sickness increased the prostration, which was a marked feature throughout her illness. A vesicular rash of bloody serum broke out over both elbows and knees, the pulse rose to 132, and she sunk the next day apparently from inanition, greatly emaciated.

She was evidently badly nourished when the illness overtook her, and hunger was a prominent symptom on the eleventh and twenty-eighth days and subsequently. On the twenty-third day the pulse obtained its maximum, and there was active delirium for forty-eight hours; but on the twenty-seventh day she was lying composedly on her side, and she slept tranquilly through the greater part of her illness. The tongue moistened on the eleventh day; and, except on the fourteenth, it was afterwards quite moist.

The *post-mortem* examination revealed smooth and almost pale cicatrices in the place of Peyer's patches in the lower part of the ileum, and above this, ulcers in an advanced state of cicatrization. The large intestine was healthy, and contained healthy fæces. The liver was friable and greasy. Both lungs were bound to the chest-walls by old membranous adhesions, and the lower lobes were in a state of splenization.

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CASE 15.—*An attack of moderate severity, with limited bronchitis. Convalescence on the thirtieth day.*

Jane J—, æt. 19, was admitted on the fifteenth day of an attack of fever, with diarrhœa and rose rash, moderate pyrexia, pulse 124, abdomen painful, tongue moist.

Treatment.—She took from the sixteenth to the twenty-eighth day ℥xv Succi belladonnæ, sextis horis; and from the nineteenth to the twenty-sixth ℥x Spiritus terebinthinæ, ter in die, and also ℥iv of wine a-day.

Progress.—Fresh rash appeared till the nineteenth day. The diarrhœa ceased after the twenty-first day. There was prostration and limited bronchitis from the nineteenth to the twenty-third day. On the twenty-sixth day there was great improvement and hunger. On the twenty-eighth the pulse and temperature were normal, the bowels constipated, and she once vomited her food (custard). The next day the skin was perspiring freely. She was convalescent on the thirtieth day, but required several doses of castor oil subsequently to relieve constipation.

CASE 16.—*A moderately severe attack of enteric fever, with prostration and apathy. Convalescence dated from the thirty-eighth day.*

Johanna G—, æt. 12. Admitted on the seventeenth day of an attack of fever; abdomen tense and painful, and exhibiting a few rose papules; pulse 116; apathetic.

Treatment.—She took ℥xv Succi belladonnæ, sextis horis, from the eighteenth to the thirty-eighth day.

Progress.—The pulse fell to 100 the day after admission, and from this time to the thirty-eighth day the daily average was 78. Fresh rash appeared till the twenty-seventh day. There was delirium on the twentieth and twenty-first days, and she was drowsy and apathetic on the twenty-second. The tongue was moist throughout, and, excepting during the second week, there was no diarrhœa.

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CASE 17.—*A moderately severe attack of enteric fever. Convalescence on the thirtieth day.*

Jane S—, æt. 18, was admitted on the tenth day of a severe attack of fever, which was attended with purging and vomiting from the first. There were a few rose papules on the abdomen; pain in the cæcal region and high fever; and a dry, red, and cracked tongue.

Treatment.—She took ℥xv Succi belladonnæ, sextis horis, from the eleventh to the thirtieth day; and gr. j Opii, omni die, from the thirteenth to the twentieth day.

Progress.—Fresh rash appeared till the twenty-first day. Diarrhœa was rather severe between the thirteenth and eighteenth days, when it ceased, and was followed by constipation. On the twenty-second day the motions were hard, and there was hunger. The daily average of the pulse was 77; the tongue moistened on the twelfth day, and continued moist and clean, but abnormally red throughout.

CASE 18.—*Acute tuberculosis of the lungs and intestines, simulating ordinary pneumonenteritis. Death on the eighteenth day.*

Charity G—, æt. 15, fair and fat, admitted on the eighth day of her illness, which arose from cold, and was attended by anorexia and diarrhœa. The pyrexia was moderate; pulse 116; the tongue dry, red, and cracked, but moist at the edges; abdomen natural, with eight or nine rose papules; diarrhœa; the face much flushed.

Treatment.—She took ℥xv Succi belladonnæ, sextis horis, from the eighth to the eleventh day, and ℥viiss from the eleventh to the eighteenth. Poultices were continually applied to the abdomen from the fifteenth day, and she took ℥viij of brandy on the sixteenth and seventeenth days.

Progress.—The patient got rapidly worse; the pulmonary congestion and abdominal inflammation became intense; the iliac and umbilical regions were very painful and tender; fresh rash was developed until the fifteenth day. There were delirium and sordes on the tenth day. On the sixteenth the pulse was

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140, and on the eighteenth day 178, and the respirations 50; the surface became livid, the abdomen distended, and she died on the eighteenth day.

The whole of the glands of the last three feet of the ileum were enormously swollen and converted into yellowish-black sloughs, surrounded by dark purple elevated and almost bleeding edges. The lungs weighed 3½ pounds, and were severely congested and stuffed with sago-like grains of recent tubercle.

CASE 19.—*A moderately severe case. Convalescence on the thirty-third day.*

Ann B—, æt 8. Ill a fortnight before admission. On the fifteenth day of the disease enteric fever was fully developed; rose spots on the full, painful abdomen; watery ochre-coloured stools; tongue red and cracked; pulse 120; temperature 101·4.

Treatment.—From the fifteenth to the thirtieth day of the disease she took ɱxxx Succi belladonnæ, quartis horis, and thenceforward to the thirty-fourth day the same dose every six hours.

Progress.—There were never more than three watery stools in the twenty-four hours, and some days only one. The temperature reached 103·2°, and the daily average of the pulse was 110. The tongue was moist from the sixteenth day onwards, and usually clean and red; the skin, however, continued harsh and dry. There was no diarrhœa after the twenty-fifth day, and on the thirtieth day the motions were hard. Convalescence was established on the thirty-third day.

CASE 20.—*A mild case. Convalescence on the twenty-third day.*

Mary W—, æt. 7. Admitted on an undeterminable day of pyrexia and abdominal tenderness, with occasional diarrhœa. Symptoms of enteric fever were not positively declared until the eleventh day after admission; up to which time the daily average of the pulse was 112, ranging from 144 to 92. She took acetate of ammonia.

Treatment.—ɱxv Succi belladonnæ, sextis horis, from the eleventh to the twenty-second day.

Progress.—On the fourteenth day the pulse had fallen from

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128 on the eleventh, to 92. Moderate diarrhœa continued for several days, but the pulse gradually fell to 84, and her condition improved, so that on the twenty-third she was convalescent and took fish.

CASE 21.—*A mild case. Convalescence on the eighteenth day.*

Annie H—, æt. 6. Admitted on an undeterminable day of a pyrexial attack, which proved on the fourth day of her residence in the hospital to be due to enteric inflammation. Up to this date she took acetate of ammonia, and the daily average of the pulse was 123.

Treatment.—From the fourth to the eighteenth day she took ℥xv Succi belladonnæ, sextis horis.

Progress.—The diarrhœa was moderate, and she was convalescent on the eighteenth day; indeed, she began to eat fish on the fourteenth day.

CASE 22.—*A case of moderate severity. Delivery of a seven and a half months' child on the thirty-first day. Relapse on the fifty-second day. Convalescence on the sixty-eighth day.*

Charlotte L—, æt. 38, pregnant, between seventh and eighth months. Admitted on the twenty-first day of an attack of fully developed enteric fever. The rose rash was present. On the average there were two watery stools a day; pulse 128, of good volume and power; temperature 103°; tongue parched, covered with a thick layer of cracked exfoliating epithelium; pupils dilated.

Treatment.—She took from the twenty-first to the sixty-second day ℥xv Succi belladonnæ, sextis horis.

Progress.—The eruption continued to appear until the thirtieth day; the pulse declined, numbering day by day 108, 104, 104, 104, and 112; the tongue was damp; the diarrhœa was unchecked. On the thirty-first day labour pains came on, and she was delivered without undue hæmorrhage. Both mother and child progressed favorably. The lochial discharge was scanty, and ceased on the forty-sixth day; the diarrhœa moderate; and the pulse, after attaining a maximum of 116 on the thirty-second day, declined to 88 on the fortieth, when the tongue and skin were naturally moist. The bowels had not

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acted for two days; and there was desire for solid food. No milk was secreted, and on the forty-second day the breasts were small and flaccid: she had previously had abundance of milk, and nursed eleven children. The motions on this day were solid, the pulse 100, and she appeared convalescent. She took fish on the forty-second, but the bowels again becoming loose on the fifty-second day, it was discontinued on that day. The relapse, with vomiting of bilious matter on two or three occasions, diarrhœa alternating with constipation, and the eruption of fresh spots, continued until the sixty-seventh day. After which she rapidly convalesced, and was quite well on the seventy-second day, and both the patient and her infant left the hospital well on the eightieth day.

The relapse was attended with greater pyrexia than the first part of her illness, the daily average of the pulse being 110. On the day after the belladonna was omitted it fell from 120 and 124 the two previous days to 108, and then gradually declined.

CASE 23.—*A mild case. Convalescence on the twentieth day, followed on the twenty-sixth by a mild attack of variola.*

Elizabeth S—, æt. 23. Admitted on the sixth day of an attack of enteric fever. A rose rash was present on the chest and abdomen; the pyrexia was considerable; pulse 132; temperature 103·1°; the bowels confined; the tongue moist and coated. She took acetate of ammonia until the tenth day. There was a plentiful eruption of rash, constipation, and a declension of the pulse to 108.

Treatment.—From the tenth to the eighteenth day she took ℥xv Succi belladonnæ, quartis horis.

Progress.—Excepting a considerable rise of pyrexia on the eleventh day, accompanied by diarrhœa, the symptoms rapidly abated, and she was convalescent the eighteenth day, and continued well up to the twenty-sixth day, when she had a slight pyrexial attack, followed by a sparse eruption of modified variola, which was very prevalent at this time.

The daily average of the pulse during the exhibition of the belladonna was 102, as against 114 during the use of acetate of

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ammonia. On the fifteenth day the skin was sweating and of normal temperature.

CASE 24.—*A moderately severe case. Constipation during the third week. Convalescence began on the forty-second day.*

Ellen M—, æt. 6 (daughter of Catherine; see Case 14). Admitted about the fourteenth day of fever. Pulse 136; temperature 104°; epigastrium tender; tongue moist and coated.

Treatment.—℥viiss Succi belladonnæ, sextis horis, from the fourteenth to the fiftieth day. Poultices to the abdomen. ℥x Tincturæ opii per rectum on the twenty-eighth day.

Progress.—The bowels were costive till the twenty-second day. From this date to the thirty-fourth day the diarrhœa was severe, the abdomen tumid, and on one or two occasions there was bilious vomiting. On the fortieth day she had the first consistent motion. Convalescence began on the forty-fourth day. On the fiftieth the bowels were acting naturally, the tongue was clean and moist, and there was hunger. She left the hospital well on the sixty-second day.

The daily average of the pulse from the fourteenth to the forty-fourth, when it had descended to 88, was 108. From the fourteenth to the twenty-ninth day the tongue was dry and brown; for the next six days it was merely dry or dryish, and thenceforward moist; and on one of these days there was vomiting. There was no delirium throughout.

CASE 25.—*A case of ordinary severity. Convalescence on the thirty-second day.*

Ellen S—, æt. 13, was admitted on the fifth day of a febrile attack, attended with headache and severe pains in the limbs. On the sixth day she was drowsy. Temperature 102·4°; tongue moist and coated; pulse 120; and the bowels confined. The constipation continued until the ninth day, when the bowels become loose, and rose spots appeared on the abdomen. During the next two days the enteritis was fully developed. Up to this time she took acetate of ammonia the pulse ranged from 120 to 100, and the tongue was moist and coated.

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Treatment.—From the ninth to the twenty-third day she took ℥xxx Succi belladonnæ, quartis horis.

Progress.—On the tenth day the pulse was 116, as on the ninth, before the belladonna was given. On the two following days it decreased to 112, and next day to 92. On the fifteenth and sixteenth days it rose to 104, and then gradually declined to 88, the number on the twenty-third, the day of convalescence. The daily average of the pulse for seven days before the use of the belladonna was 115; the average for fourteen days during its use was 100. The diarrhœa attained its maximum on the thirteenth, fourteenth, and sixteenth days, when the motions were watery and very frequent. The tongue was moist throughout the illness: it was coated with white fur up to the tenth day, and then gradually became clean. She took full diet on the thirty-second day.

CASE 26.—*A severe attack, complicated with broncho-pneumonia. Relapse on the thirty-fourth day. Convalescence on the seventieth day.*

S. L—, æt. 17. Admitted on the fifth day of an attack of fever, with acute pulmonary congestion; constipation; a moist, white, furred tongue, and moderate pyrexia. The symptoms of enteritis were developed on the twelfth day. The average of the pulse for the previous six days (fifth to eleventh day) was 115.

Treatment.—From the eleventh to the sixteenth day she took ℥xxx Succi belladonnæ, and thenceforward to the thirtieth day ℥xv, every six hours. Poultices were continually applied to the chest; and from the fourteenth day onwards ℥iv of brandy were given daily.

Progress.—From the twelfth to the eighteenth day there was severe diarrhœa and diffuse broncho-pneumonia, and the condition of the patient was critical, and she lay on the back with flushed cheeks, nearly apathetic, until the nineteenth day. On the fourteenth day the pulse was 132, the tongue parched, and there was delirium. Excepting on this day, the tongue was moist and gradually became clean. She was convalescent and took fish on the thirtieth day.

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Analysis of the symptoms.—Diarrhœa continued until the nineetenth day; on the twenty-first and afterwards the motions were solid. Free expectoration occurred on the nineteenth day, and thenceforward declined.

The furred tongue became parched on the fourteenth day, but the following day and afterwards it was continually moist and nearly clean.

Free sensible perspiration appeared on the nineteenth day.

The pulse averaged from the twelfth to the thirtieth day 100. It reached its maximum of 132 on the fourteenth, and again on the nineteenth day.

She was delirious on the thirteenth, fourteenth, and fifteenth days.

On the thirty-fourth day there was malaise with epigastric tenderness and nausea; and on the thirty-sixth day a distinct relapse of enteric fever, with bronchitis on the forty-first, and she went through a repetition of her former illness. She convalesced on the sixty-fifth day; but, though very hungry, could not take meat diet without reproduction of diarrhœa until the seventy-seventh day.

In the second attack she was simply treated with acetate of ammonia. The pulse averaged during the twenty-eight days (from the thirty-sixth to the sixty-fifth) of the relapse 115·5. The tongue, as in the former attack, was for the most part clean and moist throughout. The pyrexia and other symptoms were rather more severe in the relapse than in the primary fever.

CASE 27.—*A severe case, complicated with extensive pulmonary congestion. Convalescence on the fifty-eighth day.*

Catherine K—, æt. 12. Had been ailing about three weeks before admission with "pain in the stomach and back and occasional looseness of the bowels." The abdomen was full, the pulse 104, temperature 103°, and she was drowsy and apathetic.

Treatment.—She took ℥viiss Succi belladonnæ from the twenty-first to the fifty-first day, and for some time linseed poultices were constantly applied first to the abdomen and then to the chest.

Progress.—The day after admission (twenty-second day) she

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had a semisolid, light yellow stool; the next day the abdomen was tense and tender, and there were three loose, ochre-coloured stools. On the twenty-fifth day pneumon-enteritis was fully developed, and she was in a typhous state. The respirations were forty-eight, and there was crepitation in the bases of both lungs. A copious rose rash on the front of the trunk, and slight epistaxis. The bowels were alternately loose and confined up to the thirtieth day, after which there was no diarrhœa and a subsidence of both the abdominal and pulmonary symptoms. She, however, continued in a typhous state, sometimes passing her evacuations in bed until the fortieth day, when she became fretful. Intelligence then rapidly increased, and she was able to take fish on the fifty-first day. The daily average of the pulse during the pyrexial state (the nineteenth day following her admission) was 108·3. The maximum (120) was attained on the twenty-eighth and twenty-ninth days. The tongue continued parched and covered with sordes up to the thirty-third day.

On the fiftieth day the temperature was normal, the pulse 84, the skin natural, and the tongue clean and moist.

CASE 28.—*Fully developed enteric fever, with normal or nearly normal temperature and pulse throughout. Convalescence on the twenty-sixth day.*

Emily H—, æt. 14. Had been ailing for a week before admission, and the last two days she had rigors, headache, sickness, and pains in the limbs. The temperature was 102·6°, the pulse 112. Respiration 28. Abdomen natural; no diarrhœa. Tongue moist and furred.

Treatment.—She took ɱx Succi belladonnæ, quartis horis, from the seventh to the twenty-sixth day.

Progress.—On the eighth day four or five rose papules appeared on the abdomen, and there were two loose, light yellow stools. Fresh rash appeared until the twenty-third day; diarrhœa continued rather profuse some days until the seventeenth day, and there was subsequent constipation. The pulse and temperature declined, and, as will be seen in the following table, were almost normal throughout.

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	Temp.	Pulse.		Temp.	Pulse.
7th day	102·6°	112	20th day	97·6°	64
8th „	102·2°	104	„ evening	100°	
9th „	100·5°	100	21st day	99·1°	92
10th „	100·6°	100	„ evening	98·4°	84
11th „	99·8°	84	22nd day	99·1°	92
12th „	98·4°	76	„ evening	98°	84
„ evening	100·2°	86	23rd day	...	84
13th day	98·4°	88	24th „	98·8°	100
14th „	98°	72	„ evening	98·4°	96
„ evening	100·2°	80	25th day	99·8°	96
15th day	98·4°	80	„ evening	99·6°	104
16th „	100°	92	26th „	98·4°	84
„ evening	100·1°	76	27th day	98·4°	84
„ „	99·3°		„ evening	99°	
17th day	98·6°	84	28th day	99°	96
„ evening	101·8°		30th „	99°	100
18th day	98·4°	84	„ evening	97·5°	96
19th „	99°	84	31st day	„	„
„ evening	100°	86			

The tongue was moist and nearly clean throughout, and the mind was clear. This and Case 27 were two of fourteen patients who were admitted into the hospital from a school at Highgate, where enteric fever was for a time endemic.

The preceding abstracts of cases have been taken in the order in which they appear in my note-books. They will be found sufficient, I think, both as to number and variety of the symptoms, to illustrate the use of belladonna in this disease. Owing to the various complications and accidents which attend the course of enteric fever, it is perhaps more difficult to estimate the value of a given drug in this disease than in any other, and a correct estimate can only be formed from a large number of cases.

Analysis of the foregoing cases with reference to the degree of development of the particular symptoms, shows the following results:—1. As to the pyrexia. It appears that *the rate of the pulse and the degree of temperature* were never, as a rule, increased, but,

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on the contrary, both these symptoms uniformly declined under the use of belladonna. The daily averages of the pulse above given are, considering the severity of the cases, certainly low. My own impression is that the stimulant action of belladonna on the heart is converted in the pyrexial state into a tonic and, if not pushed too far, even a sedative influence on the heart and blood vessels generally; in other words, that it is a tonic and sedative to the sympathetic nervous system generally. This I take to be the fundamental explanation of its effects in the febrile state. By this action the capillary circulation is accelerated, the contraction of the vessels promoted, and thus the arterial tension which attends congestion of the parenchymatous organs is relieved, and a load at once removed from the heart. Diminuition of temperature is the direct consequences of these changes.

As the result of the prolonged use of belladonna after the cessation of the pyrexial stage, I have noted an irritable debility of the heart as if it had been exhausted by over-stimulation, and the nervous system has also shown a participation in this effect. Thus, with reference to the heart, a young woman, æt. 18, for example, continued to take a moderate dose (ɱx) of belladonna juice every four hours for nine days after convalescence, and as she reclined on her bed in a state of rest, the pulse numbered 60 and the respiration 16. With the finger still on the pulse, and after three or four deep inspirations, it rose immediately to 88. In these cases there is generally a little hurry and excitement, and a liability to flushing when spoken to. These, the usual consequences of prolonged fever, are, I believe, exaggerated by the abuse of belladonna. When taken in conjunction with the fact stated in the outset, it appears that the beneficial use of belladonna lies, with narrow limits as to dosage, and that vigilance must be exercised lest these limits be exceeded.

As to *delirium*. Except in a very small proportion of cases, I have not observed that this symptom in enteric fever is increased by belladonna, and I have never withheld the drug on account of delirium. In the three or four cases referred to, I have not always been sure that the delirium and belladonna have stood to each other in the relation of effect and cause. Speaking generally, the effect of the belladonna was to diminish

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the insomnia so frequently present, and it may therefore be said to have a slight hypnotic and calming effect on the cerebro-spinal system.

As to the condition of the *tongue and skin*. One of the most noticeable effects of belladonna in the pyrexial condition is moistening of the tongue. In many of the cases above recorded the patient had been admitted with a dry, parched tongue, and it has become soft and moist after a few doses of belladonna, and has remained so during the further progress of the disease, notwithstanding, in many cases, an increase in the severity of the general symptoms. No particular effect on the skin was noted, but those critical sweats, attended as they commonly are in this disease by a copious eruption of sudamina, occurred as frequently and abundantly as when no belladonna was given (see, *e. g.* Cases 7, 10, 23 and 26).

As to the *alvine discharges*. As far as I could determine, the diarrhœa was not directly influenced either way; but in those cases in which the belladonna was given from an early stage of the disease, it appeared to me to be of shorter duration. The tendency to hæmorrhage in like manner appeared to be uninfluenced—directly at least. It happened in 12, or about 5½ per cent. of the cases treated. The point to which I particularly directed my attention was the reappearance of bile in the stools, and I have a decided impression that the liver was restored to a healthy action at an earlier date in the belladonna cases than in those treated by ordinary remedies (such as chalk, catechu, dilute sulphuric acid, and opium). This was indicated by the yellowish-brown colour of the fæces, and sometimes by bilious vomiting about the third week of the disease; and in many cases by an early cessation of the diarrhœa and the formation of solid, normal-coloured fæces.

Passing from these particular indications, I will now give the general results as indicated by the proportionate mortality.

The total number of patients treated with belladonna during the whole or only a portion of their illness was 228, of whom one half were females.

The average age was 18 for both sexes, and the average duration of residence in the hospital about 37 days.

Of the total numbers 28 died, *i.e.* 1 in every 8·14, or 12·28 per cent.—a low rate of mortality, but susceptible of being placed in

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a more favorable light still, as the following facts will show. The belladonna treatment was soon applied indiscriminately, and only withheld when the increase of delirium, urgent pulmonary symptoms, hæmorrhage, or perforation rendered the use of other remedies imperative. Belladonna was therefore given to a number of patients admitted in the third, fourth, or even fifth week of their disease, and of some of whom it may truly be said that they were brought into the hospital to die. This will appear from the following brief summary of some of the fatal cases included in the mortality estimate given above.

1. Martha H—, æt. 21, was ill a month before admission, and died ten days afterwards. The lower end of the ileum was loaded with thick-margined congested ulcers. The right lung was bound down by old adhesions, and the upper lobe as well as the lower lobe of the left lung spleenified.

2. Catherine M— (see case, p. 215) had almost completely recovered from the intestinal lesion, the fæces being normal, and all but one or two ulcers healed, when she sank of sheer inanition.

3. Charity G— (see case, p. 218). In this case general tuberculosis was undoubtedly fully developed before she was admitted into the hospital, of which she was an inmate only eleven days.

4. Rachel S—, æt. 12, was admitted at a late period of the disease in a typhous state, with sordes on the teeth and a pulse of 140. She took belladonna only two days, and died five days afterwards.

5. Mary J—, æt. 23, was also admitted at a late period of the disease in a typhous condition, with sordes and active delirium. She took belladonna two days only, and died five days after admission.

6. Elizabeth D—, æt. 16, was also admitted in a typhous condition, and with sloughing of the labia pudendi. She took belladonna only two days, and died on the tenth day of her sojourn in the hospital.

7. John C—, æt. 14, was admitted in the fourth week of his illness, delirious, and with a pulse of 130. He died seven days

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afterwards of perforation, which appeared to have occurred before admission, for there was no indication of any fresh abdominal lesion afterwards.

7. James B—, æt. 19, was admitted at the end of the fourth week of his illness. He took belladonna only four days, and died on the fifth day after admission. The lower lobes of both lungs were in the stage of red hepatisation; angry, bleeding ulcers still occupied the sites of the lower Peyer's patches.

9. Leonard D—, æt. 10, was admitted in a prostrate condition in a late stage of the disease, and died after forty-eight hours, when it was found that the pericardium was wholly adherent (old adhesions), the valves of the left heart had been the seat of previous rheumatic endocarditis, and the ulcers of the ileum were nearly healed.

How far these cases should be excluded in calculating the death-rate and in determining the remedial influence of belladonna in enteric fever, or rather that concurrence of pulmonary and enteric inflammation, which I have elsewhere termed pneumonenteritis, I will leave the reader to determine. I have felt it proper to bring forward every case in which belladonna was given, but it will at once be conceded that Cases 4, 5, 6, and 9 just specified should be excluded. This would reduce the death-rate to 1 in 9·3, or 10·71 per cent.—a most satisfactory result.

Six of the whole number died of perforation of the ileum. Pneumonia was the immediate cause of death in a considerable proportion of the remainder.

The belladonna treatment was continuously pursued throughout two years, viz. from November, 1869, to November, 1871; and during this period I find that 131 other cases of enteric fever in my practice were treated in the usual way.[1] From this it might be inferred that a selection was made of the cases as to the particular treatment to be adopted, but this was not so, but the variation was determined by several causes; thus, in a number of cases enteric symptoms were undeveloped for some time, during which the nature of the case was somewhat doubtful, and in these cases the treatment first adopted was continued; or a sudden outbreak of diarrhœa or hæmorrhage called for astrin-

[1] All these cases came under my care in the London Fever Hospital.

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gent remedies. At one time the supply of belladonna was exhausted and not immediately renewed. At another time a temporary change in the resident medical officers in charge of my patients led to the adoption of the ordinary treatment, which I was glad to continue, in order that I might have a number of concurrent cases with which I could compare those treated by belladonna.

These cases, 131 in all, that is rather more than half the number of the belladonna cases, afford the following statistics:— 20 or 1 in 6·5 died, thus giving a death-rate of 15·26. But 3 of these died within twenty-four hours of their admission into the hospital, thus reducing the mortality to 13·28. This is a low rate as compared with that of the whole number of patients suffering from enteric fever admitted into the London Fever Hospital during a period of twelve years (from 1848 to 1859). The mortality for this period was 17·26, and after deducting the deaths which took place within forty-eight hours after admission, 15·82.[1]

The question suggested by my own figures is, whether the diminished rate of mortality in the cases under ordinary treatment should be attributed to the use of belladonna in the greater proportion of the whole number of cases?

This is a question which must be decided by a further experience of the drug. I think I have adduced sufficient evidence to show that the use of belladonna in enteric fever has been so far attended with good results; and that the theory of its action, which I have propounded at the outset, has been borne out in practice.

[1] Murchison, 'Contagious Fevers of Great Britain,' 2nd edition.

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REPORT OF

ST. THOMAS'S HOSPITAL MEDICAL AND PHYSICAL SOCIETY.

Officers.

President and Treasurer.—W. W. WAGSTAFFE, ESQ., F.R.C.S.

Vice-Presidents.—THE PHYSICIANS, SURGEONS, ASSISTANT PHYSICIANS, ASSISTANT SURGEONS, C. STEWART, ESQ., A. O. MACKELLAR, ESQ., DR. TURNER DR. GREENFIELD, DR. REID, S. OSBORN, ESQ.

Hon. Secs.—MR. ROSSITER, MR. JACOB.

This Society was founded before the year 1825. The Meetings are held weekly during the Session for the reading of papers and the discussion of subjects in Medicine, Surgery, and the Collateral Sciences.

REPORT OF PROCEEDINGS, 1874-5.

October 8th, 1874.

The PRESIDENT gave an inaugural address, first reviewing the history and objects of the Society, and then having divided the members into three classes—the workers, the talkers, and the listeners—he addressed some suggestions to each respectively.

October 22nd.—The PRESIDENT in the Chair.

Mr. BARKER read a paper on "The Medical Education of Women," in which he discussed the two questions :(1) of their education with a view to general practice; and (2) of the better instruction of midwives.

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November 5th.—Dr. TURNER in the Chair.

Mr. GILL read a paper, in which he gave a translation of a clinical lecture "On Transfusion," by Dr. Leishrink, of Hamburg; adding some recent researches by Heyfelden and by Gesellius, of St. Petersburg.

November 12th.—The PRESIDENT in the Chair.

Mr. JACOB brought forward two cases of exophthalmic goître under treatment in the hospital.

Mr. H. L. BERNAYS narrated a case of erythematous eruption with pyrexia occurring after vaccination in a girl, æt. 23, with mitral disease. Typhoid symptoms supervened, and she died nineteen days after admission. No intestinal or other lesion was found, except slight patches of inflamed lung.

Mr. PITTS called attention to a case of elephantiasis, in which the lymphatics of one leg were largely dilated, and yielded on puncture a copious creamy fluid resembling chyle.

He also described a case of knee-joint disease in a boy, accompanied with lengthening of the affected limb.

November 30th.—The PRESIDENT in the Chair.

Mr. SAVILL read a paper on "The Conjoint Examination Scheme," pointing out the advantages it possessed over the present system.

December 3rd.—Dr. JOHN HARLEY in the Chair.

Mr. FREUND read a paper on "Vomiting: its Causes and Treatment."

December 7th.—Mr. VERDON in the Chair.

Mr. NICHOLSON brought forward a case of aneurism of the ascending aorta.

Mr. JACOB exhibited the specimen of suppurating hydatids of the liver, which during life simulated malignant disease.

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December 17*th.*

The Annual Microscopic Soirée was held in the library, when the following and other specimens were exhibited:

Table 1. Mr. Wagstaffe. Epithelium.
„ 2. Mr. Liebreich. Microscopic and other Preparations of the Eye.
„ 3. Mr. Croft. Brain and Spinal Cord, &c.
„ 4. Mr. Stewart. Miscellaneous.
„ 5. Messrs. McKellar and Verdon. Malignant Growths.
„ 6. Surgical Instruments—Exhibited by Mr. Millikin.
„ 7. Preparations of Gold, &c.—Lent by Mr. Makins. Minerals—Lent by Dr. Bernays.
„ 8. Views, &c.—Exhibited by Messrs. Murray and Heath.
„ 9. Dr. Turner. Urinary Deposits, &c.
Mr. A. W. Bennett. Botanical Specimens showing Structure of Plants and of Coal.
„ 10. Mr. Rainey. Diffusion in Liquids.—Artificial Production of Shells.—Injected Preparations, &c.
„ 11. Physiological Apparatus — Exhibited by Mr. Hawksley.
„ 12 Dr. Reid and Mr. Osborn. Circulation, Normal and Inflamed.—Ciliary Motion.—Cyclosis.
„ 13. Dr. Payne. Pathological Preparations.
Dr. Stone. New Thermoelectric Pile, Diffraction Spectra, Polariscope and other Physical Apparatus.
Mr. C. G. Stewart. Spectra of Blood, Chlorophyll, &c.

January 7th, 1875.—Mr. Gill in the Chair.

Mr. Pickford read a paper on "Useful Faculties for Medical Men," enumerating observation, self-control, self-confidence, poetical faculty, "humbug," and good health, as the chief.

January 14*th.*—Mr. McKellar in the Chair.

Mr. Vores read a paper on "The Education required prior to entering a Medical School."

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January 21st.—Dr. ORD in the Chair.

Mr. SIDNEY BERNAYS read a paper "On Binocular Vision," describing and illustrating some experiments by Mr. Towne, and pointing out the conditions under which some binocular vision took place.

February 11th.—Mr. MASON in the Chair.

Mr. JACOB brought forward a case of lithotomy in a boy, in which remarkable variations of temperature (104·6° to 97°) continued to take place for four weeks after the operation, although the wound healed well and patient seemed in perfect health.

Mr. CAPE narrated a case of defective articulation from tension of the velum and enlargement of tonsils.

Mr. FREUND described the case of a girl with chronic knee-joint disease, in whom symptoms of phthisis appeared, but after amputation entirely disappeared.

Mr. THURSTAN brought forward a case of high temperature (104°) after confinement, followed by rapid recovery.

February 25th.—Dr. W. H. STONE in the Chair.

Mr. JACOB read a paper on "The Medical Aspects of Mesmerism." The reader gave a short history of the use of mesmerism from the earliest times, and of its introduction to the medical faculty of England by Dr. Elliotson. He classified the phenomena under five heads, viz. (1) Sleep; (2) Simple somnambulism; (3) Clairvoyance; (4) Cataleptic rigidity; (5) Curative effects. Its use in medicine being illustrated by 300 operations performed in India under mesmeric anæsthesia by Dr. Elliotson.

March 5th.—The PRESIDENT in the Chair.

Mr. SHEPPARD read a paper on "Cremation." He commenced by describing the various modes of treating the dead, viz. (1) Exposure (including sea-burial); (2) Customs of modern savages; (3) Burial in cases, &c.; (4) Embalmment; (5) Dr. Steinber's method; (6) Burial with lime; (7) Inhumation (as generally practised); (8) Cremation. Having stated objections

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to the general adoption of the first method, he proceeded to advocate cremation under the following heads, viz. (1) in its relation to the health of the living; (2) from an economical point of view; (3) as regards the sentiments of the living; (4) in its legal aspect. The reader concluded with a description of the furnace recommended by Sir H. Thompson.

July 23rd.

Election of Officers for the Session 1875-76.

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JOTTINGS FROM THE POST-MORTEM ROOM.

By W. S. GREENFIELD, M.D.

It is impossible to make any large number of post-mortem examinations without meeting with many new and striking facts. No two cases of disease are precisely similar in all respects, and in every individual case certain variations in the morbid condition of the organs will be found which have their interest and value, either taken alone or as contrasted with that seen in other cases. Many cases derive their interest from the connection of the morbid conditions with the symptoms produced by them during life; others, from the occurrence of rare or interesting forms of morbid change; others, from the coexistence of independent diseases, or the causal interconnection of visceral lesions. In fact, it may be safely asserted that no autopsy is without interest, and that in many cases problems of the highest intricacy and interest present themselves for solution. It need scarcely be said, that of cases of interest from one or other of these points of view there has been no lack during the past year, and it would be easy to relate many post mortems illustrative of the fact even in the most ordinary diseases. But it seems to me that it is too much the fashion at the present time to place on record in Hospital Reports cases of extremely rare disease to the exclusion of others. It is, of course, to be expected that such cases should be studied with special care and interest, and it is of importance that they should be recorded. But just as in descriptions of foreign countries it is

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common to find great stress laid upon what is rare or grotesque in the buildings, the costume and the habits of the people, whilst those common-place details which in reality make or mar the life of a nation are passed over in silence, so these cases are apt to lead to a neglect of the more common diseases, and it is taken for granted that everything of importance has been made out about them. In the study of any series of cases of a common disease, however, it is impossible not to be struck with the deviations which constantly present themselves from the ordinarily accepted descriptions, and it is only when one comes to sum up these slight variations that their full force is realised. Just as the slight deviations in the orbital course of planets minutely observed, and recorded again and again, has led, and is still leading, to the discovery of new planets, so may the observation and comparison of occasional deviations from the normal course of a disease, if carefully recorded, lead to new light on its pathology and treatment. Very often it is only after a fact has been observed, and perhaps recorded in a hundred cases, but in each case has been looked upon as exceptional, that on its recurrence for the hundred-and-first time its full significance is apprehended. The rule is to regard as unimportant and exceptional such deviations from the common order of things, and hence the facts are not placed on record. If individual experiences of disease could be all collected and compared, the result would be a great alteration in some commonly received views. Some statements which are so universally accepted that they have come to be regarded as almost necessary truths, when tested by experience are found to rest upon erroneous or insufficient data. Hence it becomes the more important that every opportunity should be taken of bringing these statements to the test of facts, rather than that we should endeavour to make our facts bend to preconceptions. When we come to examine even the data on which these statements were originally founded, we are astonished at the small number of facts which were held sufficient to establish their truth.

In the following rough notes I have endeavoured to utilize some of the facts observed during the past year. If there be nothing new in the facts themselves, it may, nevertheless, be of some value to consider the cases together, and to see in what

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respects they show any important anomalies. Some of the cases are recorded at full length owing to want of the time needful to curtail or make abstracts of them, and a like excuse must serve for the hasty style, and want of reference to authorities, and other errors and omissions. I must add that the paper is to be looked upon simply in the light of a report, for which, in fact, the cases were at first collated, but want of time compelled me to abandon the project. It is hoped that the facts, at any rate, may have some permanent value.

Scarlet Fever.

Out of thirteen fatal cases of scarlet fever and its sequelæ in which a post-mortem examination was made, the causes of death may be stated as follows. One case was fatal on the sixth day from, apparently, intensity of the poison of the disease; one from œdema of the glottis; one from extensive suppuration in the glands of the neck; two from cervical abscess followed by pyæmia; one from acute renal disease with suppression of urine; five from consecutive dropsy, in one case combined with bronchopneumonia; and one patient who was suffering from severe diarrhœa, apparently died from the shock of injuries received by jumping out of the window during a sudden attack of delirium. One case was a doubtful one, and the lesions found in the intestines render it possible that it may have been a case of enteric fever.

The two more acute cases present some points of interest.

Case 1.—Male, æt. 19, fatal on sixth or seventh day of acute illness. Examination fifteen hours after death: weather warm. Skin generally of somewhat dark colour, with much purple congestion of all the dependent parts. Some discoloration about the nostrils, eyelids, and lips, as if from hæmorrhage having occurred at their edges. Rigor mortis persistent. Muscles of thorax and abdomen of rather dark colour and full of blood.

Thorax.—Pleuræ, normal. *Lungs*, right 21½ oz., left 18 oz. Both much congested towards posterior parts; of a dark slaty purple colour, except at the anterior margins; generally in a state of imperfect expansion, but without localised collapse. *Bronchi* contain a little frothy blood-stained mucus. On

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section, the lung tissue of deep red colour except at the anterior margins; somewhat firm; section smooth; on squeezing but little blood escapes from the cut vessels; no pneumonic consolidation. Throughout the whole of the lower lobes, and a considerable part of the more dependent portions of both lungs there appear, scattered through the tissue at pretty regular intervals, small spots of a dark red or almost black colour, the size of a mustard seed or less, apparently due to small ecchymoses. In the subpleural tissue are also small ecchymoses, most marked over the lower lobe of the left lung. *Pericardium*, no fluid; small ecchymoses in visceral layer. *Heart* weighs 8½ oz. Right cavities distended with clot; left ventricle contracted. Valves normal. Muscular tissue pale. *Liver* weighs 63 oz., tissue pale, substance rather flabby; on section, surface mottled with whitish and yellowish patches, due to pallor of some of the lobules and bile-staining of the others; nothing very definitely of morbid character to the naked eye. *Spleen* weighs 16½ oz.; is very large, of dark colour externally, and somewhat firm; on section, of deep red colour, mottled with very distinct pale pink Malpighian corpuscles. The tissue breaks down pretty readily; pulp greasy to the touch. *Kidneys* weigh 12½ oz., both somewhat enlarged, flabby, pale; capsule very readily stripped off; surface smooth, glossy, pale, with very distinct and somewhat congested venæ stellatæ. On section, cortical substance slightly swollen, pale; outline of bases of pyramids indistinctly defined; the colour of the whole opaque pinkish white; Malpighian tufts not visible; no sign of congestion of the organ. *Small intestines* filled with fluid of light yellow colour (as from egg and milk diet), the surface of the mucous membrane in many places deeply stained with bile. Duodenum, jejunum, and upper part of ileum normal. Throughout the lower half of the ileum, especially in the lower two feet, the solitary glands very distinct, swollen, projecting on the surface of the mucous membrane as hard shotty prominences, the size of a small mustard seed, many of them with a small black dot in the centre; in the lower two feet of the ileum some small ulcers, mostly the size of a pin's head; in one or two places these are confluent into larger ulcers. Peyer's patches for the most part distinct and of healthy appearance, but at the lower end of the ileum one of them is swollen and vascular, some

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portions of it raised about a line (two millimètres) above the surface, and hard to the touch, but not ulcerated. Another, an inch above this, presents a raised border, which is thickened, vascular, and slightly ulcerated on its surface; and still higher up is another on which two or three of the follicles are much swollen and elevated above the surrounding portions. No sign of catarrh of the mucous membrane. *Mesenteric glands* somewhat but not greatly swollen. *Large intestines* throughout their whole extent, but especially towards the lower part, the follicular glands swollen, of "shaven-beard" appearance; no ulceration. Slight catarrh towards the lower part of the colon and in the rectum. *Throat, &c.*—Tonsils, especially the left, somewhat enlarged, but not of great size. On the surface of the right tonsil were one or two small hard scars, apparently of old date. Slight superficial ulceration of both. On section the substance generally of pinkish-white colour, mottled with small pale yellow areas surrounded by a zone of light red colour. At one or two places small points of suppuration. *Lymphatic glands* of neck on both sides greatly swollen; those in the upper part of neck, and in the neighbourhood of the angle of the jaw, much enlarged and of a pale pink colour. On section they show patches of injection scattered over a pinkish-yellow ground. Those lower down in the neck less swollen, but of deep purplish-red colour throughout. The glands behind the sternomastoid likewise swollen and vascular. The mucous membrane of the *fauces and pharynx* appeared generally somewhat swollen, with slight superficial abrasions, but no distinct ulceration nor false membrane. *Epiglottis* somewhat thickened, but larynx and vocal cords normal. *Tongue* with a sloughing discoloured patch on the tip. *Brain* weighs 40½ oz., sinuses of dura mater containing dark fluid blood. No turgescence of superficial veins. Pia mater pale. Brain in other respects perfectly normal throughout.

I call attention particularly to this case because it bears out the observation of Dr. John Harley, that in scarlet fever fatal in the first week of the disease there is frequently found the condition of psorentery here observed.[1] Dr. Gee remarks that the lymphoid glands of the intestines may be swollen and

[1] J. Harley on the "Pathology of Scarlatina, &c." 'Medico-Chir. Trans.,' vol. lv, 1872.

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injected, and that this condition may go on to ulceration. He regards this condition as one common to scarlet fever with other pyrexiæ,[1] and we shall have occasion to mention other cases which bear out this view. Dr. Harley considers that this condition may lead to further ulceration, and in fact to go on to enteric fever. Although this view may be questioned on various grounds, it may be interesting to note two cases bearing on the question, the first of which was one of scarlet fever with a sequel of diarrhœa and other symptoms, which might have led to the diagnosis of typhoid fever; the second, a case which was believed to be one of scarlet fever, in which ulceration of the intestines, resembling that of enteric fever, was discovered post mortem.

Case 2.—Male, æt. 18; case fatal from injuries received in sudden attack of delirium; these need not be detailed. *Post-mortem* twenty-three hours after death.—Heart, kidneys, spleen, and liver normal. Brain apparently healthy (except from injuries received). Intestines very anæmic, otherwise normal; no injection nor swelling of Peyer's patches.

Case 3.—Male child, æt. 4; died four days after admission. *Lungs* healthy, so also heart, liver and spleen. Kidneys somewhat enlarged and congested, capsule not adherent. Twelve ounces of fluid in peritoneal cavity. *Small intestines:* mucous coat of the lower part of ileum inflamed; Peyer's patches swollen and injected; one small patch of ulceration of one of them. Condition of mesenteric glands not noted.

Here, on the one hand, was a case with symptoms simulating those of typhoid, but in which the intestines were healthy; whilst on the other, without any symptoms, were lesions to some extent resembling those of typhoid.

In the two other cases fatal in the more acute stage, one from œdema of the glottis, and the other from acute nephritis with suppression of urine, the intestines were perfectly healthy, but in the latter some of the mesenteric glands were swollen; the latter case, however, was fatal in the third week of the disease.

The two cases in which secondary abscesses ensued on cervical abscess will be mentioned under the subject of pyæmia. In another case fatal from cervical abscess the fatal result seemed to have resulted from the pressure on the trachea in a weakly child six years of age.

[1] "Scarlet Fever," 'Reynolds' System of Medicine,' vol. i.

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The five cases of scarlatinal dropsy I pass over at present without comment, as I hope to publish some observations on the condition of the kidneys in these and other cases of scarlet fever under another form. I may note that in one of the cases, a child three years of age, several of the Peyer's patches in the lower part of the ileum were slightly swollen and elevated throughout, some of the follicles being more prominent and of rosy red colour. A few of the solitary glands were also swollen, but there was no ulceration.

Diphtheria and Croup.

I place these together on account of the general doubt at the present time as to how far the two diseases can be distinguished. In the postmortem room it is extremely difficult to separate them unless we have recourse to the old distinction by the limitation of the membrane to the respiratory tract, or the reverse. Only five cases are noted. I omit all reference to the condition of organs when not markedly diseased, with the exception of the intestines.

Case 1.—Male, æt. 4½. Under treatment for hip-joint disease of long standing, for which resection had been practised. Examination 29½ hours after death; weather cool. *Fauces, &c.*—Posterior part of tongue normal, free from exudation. Uvula completely covered by a layer of exudation of grey colour, which ceases abruptly at the junction with the soft palate, where there is a deeply congested border, the uvula looking as if sloughing off. Posteriorly the injection extended upwards over the middle of the soft palate for half an inch. The tonsils, fauces, pharynx, and upper inch of the œsophagus were covered by an irregular layer of sloughy looking false membrane, on separating which an intensely congested and raw-looking surface was exposed. The upper part of the larynx was also intensely inflamed, and covered with a layer of exudation which nearly filled the cavity; this condition, however, extended only as low as the false vocal cords, below which the mucous membrane was pale and of normal appearance. At the points where the false membrane ceased there was intense congestion of the mucous membrane. The subjacent and surrounding tissues were also in a state of intense congestion,

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with red points on section, the lymphatic glands of the neck swollen, turgid, with great vascularity and some ecchymosis. *Bronchial glands* normal. *Lungs* weighing each 5 oz., for the most part pale, crepitant, and of normal appearance. *Bronchi* normal, free from all trace of inflammation. The lower lobes of both lungs on section presented scattered points the size of a mustard seed, slightly prominent, of deep red colour, paler towards the centre, resembling minute points of collapse passing into lobular pneumonia. These were scattered and not very numerous, and appeared quite recent. *Stomach and intestines* quite normal throughout, glands free from all trace of swelling or vascularity.

The second case is one of "croup," and is of interest on account of the condition of the intestines. Through the kindness of Dr. Stone, I am able to give some notes of the clinical history of this case, for which I am indebted to Mr. Rossiter, the able house physician at the time.

Case 2.—T. P—, æt. twenty months. Admitted to Victoria small ward under the care of Dr. Stone, on November 7th, 1875. *Family history.*—One sister died of hydrocephalus. *Previous history.*—The child had suffered from eczema capitis, and "enlargement of the head." *Present illness.*—Was taken ill on the evening of November 3rd, with symptoms of short breath, a hoarse voice and "croupy" cough; was taken to a chemist's, who gave an emetic, which did not act. A poultice was applied to the throat. On November 4th was getting worse, was not sick.

November 5th.—Nitrate of silver was applied to the throat, and the child vomited.

6th.—The application of nitrate of silver was repeated—the child became worse and vomited twice in the day, and the bowels acted. The breathing was noticed to be "wheezing," and the child was unable to cry. When brought to the hospital on November 7th, at 12.30 p.m., there was intense dyspnœa, the respirations of a wheezing, almost squeaking character, 32 per minute; the parietes of the chest and abdomen retracting as the sternum moved forwards in inspiration, the alæ nasi working violently, and the child struggling for breath. Pupils dilated. A warm bath with mustard given at once; and Vin. Ipecac. ʒj,

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followed after an interval by ʒss. Temporary slight relief; no vomiting. 1.30 p.m., tracheotomy performed by Mr. McKellar. Trachea rather deep, and a large tortuous vein overlying it. The operation was done without chloroform, and was followed by immediate relief; no membranes were voided; the child slept at once. The steam apparatus with ʒss of creasote to a gallon of water was employed.

November 8th.—Morning—the child slept well, and is now dozing. Evening—during the afternoon was restless and coughing. The tube was changed, some pieces of firm tenacious membrane were coughed up, in which no fungus could be discovered; the child was relieved.

9th.—Was restless during night, and the breath became wheezing. The tube was again changed, without much relief. 1 p.m., gradually sank and died exhausted, conscious to the last.

Post-mortem twenty hours after death. Tongue, fauces, and pharynx normal, free from abnormal vascularity and false membrane; epiglottis injected on its posterior surface. *Larynx* completely filled by a mass of exudation and false membrane, tough and firmly adherent at its circumference, towards the centre slightly soft. This condition ceased abruptly at the level of the tracheotomy wound. Trachea and first and second divisions of the bronchi filled throughout with soft greyish puriform exudation, containing flakes of firmer character and whiter colour. On removal of this exudation the trachea appeared to be lined throughout with a thin ashy, whitish-grey membrane, looking as if the mucous membrane had been scalded. This thin layer could be torn off in flakes, exposing the muscular and cartilaginous structures, which were intensely injected. In the bronchi the layer became less uniform, and some of them were completely filled with tough membranous exudation, whilst others presented only injection of the mucous membrane, with here and there flakes of adherent false membrane. From the third divisions onwards there was merely reddening and ramified injection of the mucous membrane, the calibre of the tube being filled with puriform secretion, apparently sucked in.

Throughout the whole of both lungs were extensive tracts of lobular collapse, most marked in the middle and posterior portions, where also were some small nodules of pneumonic con-

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solidation. The collapsed portions were for the most part hyperæmic, and in process of inflammation. *Cervical glands* on both sides greatly swollen, of deep red colour, especially towards the upper part.

Intestines—Large intestines normal, with the exception of slight swelling of the solitary glands. *Small intestines.*—Throughout the whole of the ileum the Peyer's patches presented here and there patches of swelling and increased vascularity. Close to the ileo-cæcal valve the glands were generally slightly swollen, of pinkish colour, and some of the follicles surrounded by a zone of capillary injection. Proceeding upwards in the bowel a similar condition was found, but the injection of the glands became more marked in those higher up. In the lower part of the jejunum and upper third of the ileum, the solitary follicles were also swollen and injected, and some of them ulcerated. The Peyer's patches were also much more affected, in some cases the whole of a patch being much swollen, raised, and firm, of a pink or red colour, with small superficial ulcers here and there. *Duodenum* normal. *Stomach*, with slight catarrh, otherwise normal.

The succeeding two cases I give very briefly.

Case 3.—Female child, æt. 2¼ years. "Croup." *Post-mortem* 26½ hours after death. *Throat.*—Epiglottis and tonsils slightly injected, the latter with a small patch of white membrane adhering to them. Cavity of *larynx* completely filled by layers of firm exudation, and the trachea below the tracheotomy wound covered with puriform fluid. Bronchi injected, mucous membrane covered with a thin film of exudation.

Intestines.—Swelling of Peyer's patches, and of the solitary glands throughout the whole extent of the small and large intestines. Some superficial ulceration in the ileum. Patches of injection here and there on the valvulæ conniventes.

Case 4.—Female child, æt. 3½ years. "*Diphtheria.*" Tracheotomy.

Throat.—Posterior surface of soft palate, upper part of pharynx and epiglottis injected. Very firm exudation upon the tonsils and epiglottis. Larynx completely filled with exudation of the usual character. Trachea and bronchi nearly filled with tenacious yellowish, somewhat grumous material;

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from some of the bronchi this may be squeezed out in the form of a cast. Mucous membrane of bronchi injected, covered with a layer of false membrane, which may be raised as a film in the larger branches.

Intestines.—Peyer's patches swollen and injected throughout the small intestines, and slightly ulcerated in some places. Solitary glands swollen in the duodenum, lower part of ileum and in the colon. Injection of mucous membrane over valvulæ conniventes in duodenum, with here and there small ecchymoses. Catarrh of the stomach.

The next case (Case 5) was one of considerable interest, and a doubt may exist as to whether it should be regarded as a case of true diphtheria. The child had been in the hospital for a month, suffering from symptoms ascribed to broncho-pneumonia; the cough was noticed to be of "croupy" character for a day or two before death, but the nature of the disease was not suspected. There was no reason to suspect that the contagion had been conveyed from other cases, since an interval of some weeks had elapsed since the last cases of croup or diphtheria in the hospital, and they had also been carefully isolated from the time of their admission.

Case 5.—Male child, æt. 3. Much emaciated. The condition of most of the organs may be briefly summarised. There was very extensive tuberculosis, involving the lungs, pleuræ, pericardium, peritoneum, liver, intestines, and the cervical, bronchial and mesenteric glands. There was also considerable hydrocephalus, but this was apparently chronic, no tubercle being discoverable, nor any signs of inflammation. *Throat, &c.*—The anterior surface of the uvula and velum palati normal and pale, the posterior surface of the soft palate and the fauces and upper part of pharynx deeply congested, in some places of very dark colour, and covered with a thin layer of adherent false membrane, on separation of which a raw-looking surface with minute bleeding points as from capillaries torn across is left. There is also here and there some excavated ulceration. This condition extends also into the *posterior nares*, the mucous membrane of which in the posterior half is intensely inflamed and covered with a layer of false membrane. The posterior surface of the *epiglottis* and the right arytæno-epiglottidean fold

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also vividly injected and partly covered with false membrane, on separating which an angry-looking superficial ulcer is exposed. The cavity of the *larynx* is lined by layers of tenacious yellow false membrane, which does not extend below the vocal cords. *Trachea* shows signs of slight catarrh, and a few small scattered ulcers, apparently of tubercular nature. *Bronchi* generally somewhat inflamed, the larger branches containing muco-pus; mucous membrane, with some patches of inflammation surrounding small ulcers, covered by what closely resembles semimembranous exudation. The appearances in the bronchi, however, resemble rather those of tubercular ulceration.

The close resemblance in the naked-eye characters of the disease, and the implication of the nasal passages, the fauces and larynx, lead me to consider this case as one of true diphtheria. At the same time it is remarkable that it should have occurred in so insidious a manner in a child already in such an advanced state of disease. It might be suggested that the disease was really one of two other conditions, namely, aphthous ulceration such as often occurs in advanced disease and in febrile conditions in children, or a form of diphtheritic ulceration occurring under similar conditions and having some analogy to noma, and not true diphtheria. But on microscopic examination of the false membranes and of the subjacent tissues of the pharynx, the appearances which have been considered by Oertel and Nassilloff to be characteristic of true diphtheria were discovered, viz., the existence in the mucous and submucous, and even in the deeper tissues, of an enormous number of micrococci of extreme minuteness crowded together, apparently chiefly in the lymphatic spaces, or scattered through the tissues. So far as the changes in the larynx are concerned I do not think it possible to distinguish diphtheritic false membranes from other similar exudations. I have been unable in a series of cases to draw any sharp line between cases of diphtheria and croup by microscopic examination of the laryngeal mucous membrane with the adherent layers of false membrane; and if these be similar to or identical with the changes in cases of scald of the larynx, as Mr. R. W. Parker has shown, it is not probable that microscopic examination will serve to distinguish in the case by the nature of the changes in the larynx. Moreover, I have been unable to discover the presence of micrococci

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in the false membranes and tissues of the larynx in cases of unquestionable diphtheria. Supposing it to have been a case of true diphtheria, it is possible that the abraded and ulcerated condition of the mucous membrane may have favoured the action of a slight and unsuspected source of contagion.

I have noted the condition of the intestine in these cases of scarlet fever and diphtheria because of its bearing on the question of the relation of these diseases with enteric fever. I have before alluded to the views entertained by Dr. John Harley on the relation between them, and the possibility of this condition going on to produce true enteric fever. The cases here recorded are not the most typical which I have seen, and others even more characteristic might be gathered from other sources. I have elsewhere ('Lancet,' November 29th, 1873) recorded a case of diphtheria in which the swelling of the Peyer's patches and the ulceration were far more extensive than in the present cases. Mr. Warrington Haward has recently mentioned to me a case which was under his care, and to which I have his kind permission to make reference, which was one of undoubted diphtheria, in which the condition of the intestines discovered post mortem was such as to lead to the belief that it was really a case of enteric fever. Perhaps it may not be out of place to consider how far this condition of the intestines is really identical in the two cases. It is generally accepted that in scarlet fever, and also in other specific fevers, some general enlargement of the lymphatic structures of the intestinal tract occurs, and that some superficial ulceration may ensue. When, however, as in some undoubted cases, the swelling of these glands is more advanced, and the ulceration approaches in character to such as is found in enteric fever, it becomes a question whether the original disease is really complicated with the latter. But so little is known of the condition of the bowel in the first week of enteric fever, and there is so much more difficulty in fixing the date of attack of typhoid than of scarlet fever that any comparison is very difficult to make. It will be observed that in nearly all the cases of scarlet fever and diphtheria here recorded the enlargement of the solitary glands and Peyer's patches was comparatively slight; that the ulceration was also slight; and that the affection was

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most marked in the upper part of the bowel, diminishing towards the lower end of the ileum. Moreover, there was in two cases (3 and 4 of diphtheria) injection of the mucous membrane in the upper part of the small intestine. But in Case 2 the condition of the Peyer's patches was identical with that seen in the earlier stages of typhoid enlargement, especially in relapses, some of the follicles being greatly swollen, elevated and vascular. In this case death occurred on the sixth day. So also of the other case I have mentioned which was also fatal on about the fourth day.

In some recorded cases of enteric fever fatal in the first week the swelling of the glands has been general; and it seems probable that in many, if not in nearly all cases the swelling is in the early stages much more extensive than would be supposed from the appearance in later stages; a great many of the swollen glands subsiding without ulceration. Hence in cases fatal towards the end of the fourth week we may find the affection of the Peyer's patches limited to those immediately adjacent to the ileo-cæcal valve. Nor is it by any means the rule for the whole of a Peyer's patch to be found to be equally affected throughout in typhoid. I shall refer to this fact later, only mentioning it as corresponding with the fact observed in these cases of diphtheria, which is of some importance as showing that the swelling is not merely due to a *general* enlargement of the lymphatic glands. The condition of the mesenteric glands was not noted with sufficient care in any of the cases here mentioned. In some of Dr. Harley's cases they were enlarged. Rokitansky states that in the swellings of the solitary and Peyer's follicles which occur in scarlet fever, variola, erysipelas, croup and other diseases, "we invariably find the mesenteric glands in a state of tumefaction."[1] This, however, is contradicted by the experience of Dr. Murchison, who says that this condition is not accompanied by enlargement of the mesenteric glands.

It would be necessary to enter into a discussion of the pathology of enteric fever in order to discuss fully the questions here raised, and this would be out of place in a paper like the present. Further observation of cases of similar character is needed to show how nearly the lesions of enteric fever may be simulated and its symptoms produced by these diseases. If

[1] Rokitansky, 'Path. Anat.,' Syd. Soc. Trans., vol. ii, p. 89.

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the symptoms of enteric fever were solely dependent upon and secondary to the lesions in the bowels, and if similar lesions could be produced by one cause and by that alone, the decision would be of more importance. But it is believed by many that the symptoms of typhoid are not due to the bowel lesion only, and indeed that they may be out of all proportion to it, death occurring in some cases before any ulceration has occurred—just as scarlet fever and smallpox may be fatal before the occurrence of the characteristic eruption. Nor is it a matter of great importance in its bearing on this question whether the poison is introduced from the intestinal canal or by other channels; and whether it is absorbed by the lymphatics of the affected bowel and thence enters the blood, possibly after a process of multiplication or reproduction in the affected part. The analogy of other specific diseases, and of the action of metallic poisons, shows that a localised lesion may arise in certain situations after a general poisoning, analogous structures remaining unaffected. It is true that the occurrence of the lesions in the lower part of the ileum is suggestive of the idea that there is some materies morbi in the contents of the intestines which requires a certain time for its development, and possibly is hindered in its action by the gastric juice or bile throughout the greater part of the intestinal canal, and is able to act only on reaching this situation. At first sight Klein's recently published observations would seem to point to this view, but even if the fungoid growth which he has described be the specific element of the disease, a comparison of the fact with what he has observed in sheep-pox will show that it may just as probably enter by other channels, and not necessarily at the seat of eruption, in which light the bowel lesion may be regarded.

If, however, it could be shown that in naked-eye characters, situation, and course the affection of Peyer's and solitary glands in, for example, diphtheria is identical with that in enteric fever, we should yet be as far as ever from proving the identity of the two diseases. Indeed, it is a question how far any single lesion can be regarded as specifically distinctive of any given disease. To argue from identity of anatomical lesion to identity of causation of that lesion seems to me to be one of the fallacies which has most hindered the progress of scientific pathology. That the same effect may be produced by a variety of combinations of causes is an elementary principle

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of logic, yet we constantly find it overlooked in practice. If such is the case in the action of ordinary causes, how much more must it be the case when we have such combinations of actions as in the living body.

Just as in natural history the absolute specific distinctions which were formerly held to separate classes and orders of animals from each other, and animals from plants, have been bridged over by the discovery of intermediate links, still existing or extinct, which have necessitated the adoption of more elastic limits, based on the possession of certain features in common, so in disease we seem to be gradually arriving at a similar standpoint. Looking back on the history of pathology we find rapid strides in this direction during a comparatively recent period. The "tubercle corpuscle," the typhoid "corpuscle," and "deposit," are now things of the past. But while the specific nature of tubercle is denied by many, and its old sense cannot be maintained, the same process which has destroyed its formerly accepted characters has placed its nature on a far more intelligible footing. Syphilitic new growths furnish another example of a similar change of opinion. Diphtheria, again, is one of the diseases in which a specific character of the morbid product has been, and is still by some, regarded as distinctive of it from other diseases. These characters, however, fail in actual application, and, as I have elsewhere endeavoured to show, no line of demarcation whatever can be drawn between the false membrane of diphtheria and croup from their microscopical characters.[2] I pass over the question of fungus in this disease, only remarking that more recent observations have not enabled me to satisfy myself that any of the numerous varieties of fungus which have been described occur with any constancy in diphtheria of the air-passages, and that many other observers have equally failed. An observation to which previous reference has been made[3] suggests the possibility of a simple irritant

[1] "We must guard against considering every typhoid appearance in Peyer's patches, during the early years of life, as genuine typhus" (*i. e.*, typhoid). Rokitansky, loc. cit., p. 82. Trousseau states that enteritis is common in children in diphtheria.

[2] On the Pathological History of Diphtheria and Croup, a paper read before the Medical Microscopical Society.

[3] 'Clin. Trans.,' vol. viii, p. 144.

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giving rise to a similar lesion. But surely it is fallacious to argue from this fact alone that diphtheria and croup are identical. These distinctions, if any, must depend on far different charaters, such as localisation, symptoms, interchangeability of contagion and other such questions. It is unnecessary to pursue this argument further; I refer to it only because so much of the pathology of the present day seems to be embarrassed by these fallacies. Recurring again to the bowel lesion in diphtheria, it has struck me as a curious fact that it should be most marked towards the upper part of the ileum; and I may suggest the possibility of some of the false membrane or secretion from the throat having been swallowed and set up this condition.

I may add that the ulcers which may be regarded as most typical in enteric fever I have never seen in scarlet fever or diphtheria, nor can I find any description of them as occurring. I refer to the typical "plaque molle" and "plaque dur," which are seen in cases of typhoid fatal in the second week and occasionally at a later period; with their abrupt elevation above the surrounding mucous membrane, sometimes to a height of five or six millimètres—the vascular borders, and central punched-out slough discoloured with bile pigment. Nor was this observed in any of 28 of the fatal cases recorded by Dr. Harley in his paper, and only two presented any ulceration at all analogous to the fully-developed typhoid ulcer. In fact, although in the earlier stages the appearances in the two diseases may be indistinguishable, the subsequent development does not appear to be at all similar, even when the case is not fatal till the end of some weeks. In the rare cases referred to, the possibility of the coexistence or sequence of the two diseases must be borne in mind.

Enteric Fever.

Amongst only six fatal cases of enteric fever there are some peculiarities worth noting, especially as regards the ulceration of the intestines. In five out of the six there was perforation of the bowel, followed by peritonitis. In three of the cases there was ulceration of the large intestine, and in one of these the morbid process was almost limited to that part of the bowel. But it is especially to the direction of the ulcers in reference to the

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axis of the bowel and some of their other characters that I would direct attention. The only other noteworthy facts are the occurrence of ulceration of the larynx in one case, and the suppuration of the mesenteric glands in two. I give a brief note of each case, with more detail only on their special points.

Case 1.—Male, æt. 19; in hospital only one day; duration of disease doubtful.

Examined thirty-three hours after death; weather hot; body much decomposed.

Peritoneum.—Intense peritonitis, with much thick lymph matting the intestines together, especially in right iliac region; fæcal matter in peritoneum; a small perforation on anterior surface of small intestine, adjacent to ileo-cæcal valve.

Intestines.—Duodenum, jejunum, and the greater part of ileum perfectly healthy; Peyer's patches normal to within four inches of the lower end of ileum; no swelling of solitary glands. About three inches above the ileo-cæcal valve is an oval ulcer three quarters of an inch by half an inch in diameter, its largest diameter transverse, with thickened and slightly undermined edges. Over half of its base the muscular coat of the bowel is laid bare, over the other half only a sloughy-looking layer of peritoneum remains, and at the margin of the ulcer is a perforation the size of a pin's head. Immediately below this ulcer is another ulcer of similar character, and likewise transverse in direction, but nearly filled by a somewhat prominent brownish-yellow mass, apparently consisting of altered blood and a slough of the muscular coat. Below this and close to the ileo-cæcal valve are two irregularly elevated patches of rather larger size, one of which is also covered with a blood-stained slough; this also is surrounded by an irregular area, from which the normal mucous membrane is evidently absent, and which appears to be the cicatrix of an old ulcer. On careful examination of the two upper ulcers they appear to be continuous with the margin of a thickened Peyer's patch, the patches above this appearing perfectly healthy.

Case 2.—Male, æt. 7; fatal at the end of fourth week of illness.

Examined twenty-two hours after death.

Larynx.—Mucous membrane congested; above the posterior

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extremity of left vocal cord a small ulcer, leading down to the base of one of the arytænoid cartilages, which was exposed and bare.

Abdomen.—Peritoneum greatly distended with gas escaped from the bowels; much recent lymph covering the intestines, and some fæcal matter in pelvis, which was found to escape from a small rounded orifice situated about eight inches above the anus. The great omentum covered the intestines on the left side of the abdominal cavity, and was attached to the bowel, and seemed to have partially occluded the opening. At the lower end of the cæcum was also a large irregular opening in the intestinal wall with ragged edges. This was adherent to the abdominal wall by lymph. After removal of the intestines a great number of points of perforation appeared in the colon, no less than thirteen of various sizes being counted, the largest being of the size of a sixpence. At a point about two feet from the anus several points of perforation were clustered together. The omentum was adherent over several of these perforations before its removal. On inverting the bowel the small intestines were found to be healthy throughout the greater part of their extent, the Peyer's patches of perfectly normal appearance. Two small ulcers of oval outline, running transversely, were found near the ileo-cæcal valve; one of these was healed, having a smooth base and bevelled edges; the other, situated in the Peyer's patch adjacent to the ileo-cæcal valve, was more recent.

The *colon* contained numerous scattered ulcers, of size varying from that of a pea to that of a shilling; these were largest and most numerous in the transverse colon; they had ragged and undermined edges, many of them perforated; in others the base was extremely thin. To some yellowish discoloured sloughs were still adherent.

Mesenteric glands slightly enlarged.

Case 3.—Male, æt. 32; died at end of third week. Post-mortem thirty-six hours after death. Hypostatic congestion of lungs with some collapse.

Abdomen.—Intestines glued together by layers of recent lymph over lower half of abdomen only; a small perforation a little below umbilicus in the middle line, with a small collection of fæcal matter, partly encapsuled by layers of lymph.

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Duodenum, jejunum, and upper part of ileum healthy, containing a large quantity of ochrey-yellow fæcal matter. In the lower part of ileum the changes commence at about two feet from the ileo-cæcal valve. At this point several solitary follicles are swollen to the size of a split pea or more, and are in various stages of ulceration, one or two forming oval ulcers half an inch long and a quarter wide, with their long diameter transverse. Peyer's patches in this part of the bowel normal; a few inches lower they begin to show very slight swelling of one or two of them. In the lower four inches of the ileum the surface is covered with a series of very irregular, deeply excavated ulcers, with brownish-yellow adherent sloughs. Throughout the whole of the diseased portion the ulceration of the solitary follicles is much more marked than of the Peyer's patches, and nearly all the ulcers lie with their long diameters in a direction transverse to the axis of the bowel. About thirteen inches above the ileo-cæcal valve is an oval ulcer three quarters of an inch wide and half an inch long, penetrating to the muscular coat; in the centre is a perforation a quarter of an inch in diameter.

Large intestine.—One or two small oval ulcers in the cæcum, and some swelling of the solitary glands there.

Case 4.—Male, æt. 9; in hospital eighteen days; disease fatal, probably near end of fourth week or later. Post-mortem twenty-two hours after death.

Lungs.—Collapse and broncho-pneumonia.

Abdomen—Recent acute peritonitis from perforation.

Large intestines.—Normal.

Small intestines.—Disease confined to lower end of ileum. Close to the ileo-cæcal valve and for two inches above was deep ulceration, nearly the whole of the mucous membrane being denuded, and the muscular coat laid bare. At one point the peritoneal coat was laid bare and sloughy looking, but not perforated. Above this were numerous recent ulcers, some with adherent sloughs, others with excavated edges; many small and transverse, arising from the solitary glands. The perforation was situated about eight inches above the valve in the base of a large ulcer. From two feet above the valve and upwards were numerous ulcers in more or less advanced stages of healing, some completely cicatrised, and indicated only by a smooth de-

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pression with a pigmented border; others with the edges adherent to the base and rapidly healing. Mesenteric glands in the region corresponding to the diseased bowel enlarged, soft, and extremely vascular. Some caseous and cretaceous glands corresponding with upper part of small intestine, one or two the size of a hazel nut.

Spleen, weighing only two ounces, small, of dark colour, remarkably firm, but free from all traces of congestion or inflammation.

Case 5.—Male, æt. 35; duration of illness eighteen days.

Peritoneum containing a small quantity, about three quarters of a pint, of slightly blood-stained turbid fluid. Vivid red injection of the whole of the peritoneal surface of small and large intestines, with more advanced inflammation in pelvis and in right flank, where a thin layer of recent sticky lymph covers their surface. A small perforation of the bowel towards the lower end of ileum, through which a small quantity of fæcal matter had escaped.

Intestines.—Large intestines nearly empty, containing only two or three small hard scybalous masses in the caput cæcum coli; one or two small rounded ulcers in caput cæcum; mucous membrane otherwise normal.

Small intestines very full of and distended by a large quantity of light yellow matter, resembling yolk of egg with curdled milk. Solitary glands of lower end of ileum somewhat swollen and prominent. Numerous ulcers in the lower part of ileum. Close to the ileo-cæcal valve were three or four irregular ulcers, somewhat deeply excavated, but the muscular coat not exposed. Higher up were several in various stages; they were nearly all connected with Peyer's patches, but in every case only a portion of the patch was notably affected, the remainder being only slightly swollen and elevated. The ulcers were of comparatively small size, and in every case either rounded or oval, with the long diameter transverse to the long axis of the bowel. This was especially marked in the case of the ulcer which had become perforated, which was seated just twelve inches above the ileo-cæcal valve. Above this point were only two or three small ulcers, with separating sloughs, the rest of the Peyer's glands being either normal or very slightly swollen in parts. The

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ulcers were not unusually vascular, and no point from which hæmorrhage had obviously occurred could be discovered on careful examination.

The *mesenteric glands* were greatly swollen and vascular, some of them, corresponding to the most diseased portion of the intestine, were of a deep purple colour. On section of these two or three were found to be converted almost entirely into grumous pus; others presented small points of suppuration scattered through their substance, each surrounded by a zone of deep purplish-red injection.

The *portal vein* was normal.

Brain weighed 51½ ozs. Pia mater vividly injected, especially over the vertex and the frontal lobes, with here and there small punctiform extravasations in and beneath the pia mater. Cerebro-spinal fluid in some excess. On section of the hemispheres a great number of *puncta cruenta* visible, and a general pinkish colour of the centra ovalia. Grey cortical substance not notably injected. Lateral ventricles normal. A few small points of injection resembling those produced by capillary emboli were found in the kidneys.

Case 6.—Male, æt. 33; in hospital eighteen days; duration of disease somewhat doubtful, probably admitted during a relapse in the fourth week.

Post mortem twenty hours after death; weather cold; body much emaciated; abundant sudamina over the chest, arms, and trunk.

Pleura.—Right containing about 6 ozs. of turbid reddish fluid; visceral layer covered by a thin layer of recent lymph, especially over lower lobe, where some ecchymoses beneath it. *Left* normal.

Lungs.—Right, weight 33½ ozs.; a layer of superficial collapse occupying the whole of the posterior part of the lower and middle lobes, and some scattered patches of lobular collapse here and there over the surface generally; anterior margin emphysematous.

Bronchi generally inflamed, containing tenacious muco-pus, the inflammation much more intense in those of the lower lobe, where there are minute extravasations of blood, and the mucus is of dark red colour. The whole tissue of the lower

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lobe extremely congested and œdematous, exuding much deep brownish-purple fluid on squeezing; scattered through this are numerous patches of lobular pneumonia in various stages, in some parts discrete, in others confluent, especially towards the root of the lung; some of these are white, slightly prominent, granular, and dry; others appear to consist of a general diffuse exudation into large tracts of air-cells, resembling the condition often found in hypostatic pneumonia.

The middle lobe contains some scattered but well-defined patches of lobular pneumonia; the greater part of middle and lower lobe sinks readily in water; upper lobe congested and œdematous.

Left lung.—Weight 25 ozs., with a layer of collapse about half an inch in thickness at the posterior and outer aspects of the lower lobe. Lower lobe somewhat congested and œdematous, with numerous small patches of lobular collapse and one or two scattered masses of broncho-pneumonia.

Spleen.—Weight, 6 ozs.; somewhat enlarged, of dark colour, firm; on section rather tough, trabecular structure very distinct; pulp not at all readily washed away (the condition quite different from that usually seen in fever).

Kidneys of rather large size; weight, 11½ ozs., extremely firm and hard; capsule slightly adherent, but free from thickening; surface smooth, somewhat pale, with marked *venæ stellatæ*. On section the cortical substance, especially the interpyramidal portions, increased in thickness; the whole of the cortical substance of somewhat homogeneous granular appearance, of pinkish-white colour, with a whitish-yellow striation here and there; Malpighian tufts not visible. The whole of the cortical substance extremely dense and tough, resembling the condition seen in long-standing mitral disease. Microscopically, cloudy swelling of the epithelium of the convoluted and straight tubules, thickening of the vessels, and changes in the Malpighian capsules usually found in chronic Bright's disease.

Peritoneum normal.

Intestines, large.—Rectum and descending colon normal, free from congestion, firmly contracted, containing only a small quantity of pale yellow fæces; transverse colon much distended and full of similar pale yellow fluid fæcal matter. On the

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anterior aspect of the bowel, over its central part, are some transverse ulcers, one measuring nearly one inch in diameter, the others smaller. These ulcers extended through the mucous and submucous coats, and at one or two points also through the muscular coat, their edges ragged and deeply undermined, the edge in some places overlapping a quarter of an inch. They were all entirely free from trace of vascularity, pale and atonic in appearance; scattered through the remainder of the ascending and transverse colon were other ulcers varying in size from a quarter to half an inch in diameter, rounded or oval, with deeply undermined overhanging edges. The solitary lenticular glands swollen, prominent, and in various stages of disintegration, especially in the caput cæcum.

Small intestines.—Full of curdy fluid of orange-yellow colour. Close to the ileo-cæcal valve a large irregular patch of active ulceration nearly encircling the bowel; the mucous membrane greatly swollen, the ulcers very vascular, with thickened margins; the muscular coat exposed and here and there eroded by the ulceration. No trace of a healthy Peyer's patch here. Higher up in the intestine were numerous ulcers in various stages, several of small size, extremely vascular, with deeply undermined edges, the direction of nearly all the ulcers being transverse to the longitudinal axis of the bowel. In the lower eighteen inches of the ileum were also several ulcers in various stages of healing, some completely cicatrised, others with one edge adherent to the base of the ulcer and granulating, the opposite edge being greatly congested and undermined. From about two and a half feet above the ileo-cæcal valve the ulceration ceased, but above this point were patches of intense hyperæmia of the mucous membrane, the villi being injected, of a vivid red colour, and here and there some capillary rupture having occurred. This condition was found here and there as high as the jejunum, where the villi at the margins of the valvulæ conniventes were intensely injected.

Mesenteric glands generally swollen and red. In those corresponding to the lower end of the ileum and the adjacent colon which were especially inflamed, on section, small points of suppuration surrounded by injected areas were found.

With respect to these cases it must be observed that the majority

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of them were fatal at a comparatively late period of the disease. Cases 3 and 5 were fatal at the end of the third week, cases 2 and 4 at the end of the fourth, 1 and 6 probably at the fifth week or even later. This is important with reference to the characters of the ulceration. It may be noted that in one of the cases, in which there was suppuration of the mesenteric glands, there was extensive broncho-pneumonia, and in the other a condition probably due to commencing meningitis; I am myself inclined to regard these conditions as probably due to blood poisoning, and the state of the mesenteric glands themselves as pyæmic. The suppuration in both cases was in scattered points surrounded by vivid injection, and not such as usually ensues on simple irritation. So far as my memory serves me, I have never seen this condition of the mesenteric glands without other symptoms or lesions indicative of secondary blood-poisoning.

The ulceration of the large intestines is not by any means rare, usually occurring late in the disease. According to Louis it occurs with increasing frequency in the later weeks of the disease, but the number of cases on which his observations were founded was insufficient to allow of exact estimation of its relative frequency. Jenner found it in only three out of twenty cases, but more or less is found, according to Dr. Murchison, in one out of three cases; in the six cases here described it occurred in three. Case 2, however, must be regarded as very exceptional if the history of the occurrence of death at the end of the fourth week is to be accepted as correct. I would note, moreover, that the condition of the bowel very closely resembled that seen in some cases of chronic dysentery.

It may, perhaps, seem a trivial matter, and one unworthy of so much attention, that the ulceration in enteric fever is so frequently limited to portions of Peyer's patches, and does not always follow the descriptions given as typical in text-books. Nor is there in reality anything in the cases which I have mentioned different from what has been observed and described over and over again years ago. It may be a question also whether the ordinary description is not in some measure misunderstood by students. The fact remains, however, that the frequent occurrence of such cases, in which a distinction of the "typhoid" ulcer, so strongly dwelt upon in some books, is entirely wanting, leads to some embarrassment and confusion in the mind even of

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intelligent students. Now it is perfectly true that the elongated, elliptical ulcer, corresponding to an entire Peyer's patch, is not infrequent in enteric fever, although far less common than other forms. On the other hand, it is at least equally common to find it in the more acute cases of tubercular ulceration. In the case of diphtheria with tuberculosis, narrated (Case 5), the ulcers occupied nearly all the Peyer's patches in the lower half of the ileum, the whole extent of each patch being affected. Some of these were extremely well-marked examples of the so-called "plaques réticulés," each of the follicles having sloughed out and a bridge of intervening tissue remaining, so that their appearance precisely simulated that of typhoid ulcers; but to the touch they were more resistant and there was some obvious thickening of the walls. Some of the solitary glands, however, had formed ulcers with somewhat elevated but still undermined edges; and where, as in some places, only the peritoneal coat remained to form the base of the ulcer, a small plate of organized lymph had formed on the serous surface, corresponding to the thinnest point.

The descriptions of the typhoid ulcer which are found in most modern textbooks are, for the most part, copied from Rokitansky's classical work. But it must be noted that the perusal of his original description does not leave the same impression on the mind as that of the abbreviations from it; and although he mentions that the elliptical ulcer, which corresponds to the whole Peyer's patch, is, as of necessity it must be, longitudinal in direction, he draws a contrast merely with a character of the tubercular ulcer, which is sometimes, though, it must be allowed, very rarely, seen, viz. that of completely encircling the bowel, so as by its contraction to produce a stricture, an occurrence which he mentions that he had seen only once in typhoid. But as a means of distinction in ordinary cases it is obvious that this character is valueless. It remains, then, to speak of oval ulcers not corresponding to an entire Peyer's patch. I do not know that there is any mathematical distinction of an oval from an ellipse (but that the oval is an ellipse, whilst an ellipse is not necessarily oval), but it is usually taken to signify an ellipse with the major axis not greatly exceeding the minor. As regards these, the distinction as to the direction of their axis cannot be maintained in the same absolute sense. There is no question that the

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ulcers may extend beyond the borders of a Peyer's patch by a process of ulceration in the submucous tissue; this is now generally admitted. There is, moreover, no reason why the extension of the ulceration around a solitary gland should not follow a transverse direction. Dr. Murchison considers that the oval ulcers in this case are formed by the coalescence of two or more rounded ulcers, and this is probably the case with regard to some. Another possible mode in which the rounded ulcer may become more oval appears to me to be by the action of the muscular coat. As soon as the circular muscular fibres are more or less infiltrated or eroded, they naturally lose their organic function, and the retraction of the more healthy fibres beyond the bounds of the ulcer will draw with it the submucous tissue, this tending to produce in the ulcer a transversely oval shape.

But whether the character be a common one or no, it seems to me to be one of quite of minor importance. The other distinctions between typhoid and tubercular ulcers are far more characteristic and depend on the intimate nature of the two affections. Hence it may be urged that it is needless to perpetuate a method of distinction which if true is a truism, which is absent in a large number of cases, and which, whilst striking the imagination and memory of the student as a fact readily apprehended and explained, in reality adds nothing to his stock of knowledge.

There is, however, another reason for attending to the direction of the ulcers. I think it may often be observed that those cases in which the ulceration is thus found to take a direction mainly transverse to the bowel are such as are fatal at a period when all, or nearly all, the sloughs have separated, usually from perforation; and that the ulcers are due to a secondary ulcerative process, which very closely resembles that found in some cases of chronic dysentery. The ulcers are generally atonic, usually with deeply undermined edges; they are often connected with a part only of one of the Peyer's patches, and extend considerably beyond it on either side; two or three may extend across one patch. In addition to these there are commonly others, evidently due to affection of the solitary glands; these may extend around one third of the circumference of the bowel, measuring perhaps only one or two lines in width, or they may reach completely round the bowel. Occasionally all the solitary glands in the lower end of the ileum may be thus affected, no healthy ones remaining. If,

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as is sometimes the case, a like condition extends also into the large intestine, the similarity to a case of chronic dysentery is very striking, as in Case 2. In some cases one or two typical "plaques dures" may exist side by side with these other ulcers, but this is by no means of constant occurrence.

The increase in the proportional frequency of occurrence of ulceration in the large intestines, as the case is more prolonged at the time of death, seems to point to the probability that it is really later in its appearance; and it seems to me probable that the same is the case with the ulceration of similar character in the small intestines. In fact, it may be suggested that in some cases a good deal of the ulceration found has never been typical "typhoid" ulceration at all, and that the ulcers, instead of being persistent "atonic" ulcers, are of quite other formation—being, in reality, due to an ulceration of non-specific character set up by the irritation of diarrhœa or other causes.

I may add that since the above comments were made I have had the opportunity of examining two cases, which furnished a very striking illustration of these facts, but which I shall not now describe.

Phthisis.

It may be thought hardly worth while to enter into any detail with regard to so common a disease as phthisis, when the total number of *post-mortems* upon them has been so small as thirty-two. But although the facts may have little statistical value, there are one or two points of interest which may be worth noting. I do not profess to classify the cases under one or other of those varieties which are now commonly recognised, but rather to take them as a whole; whatever may be the value of the distinctions which modern histological research has established, there can be no question that the treatment must be guided rather by the clinical characters and the complications. However great the number of forms which may be established histologically, there will always be a still greater variety in cases from their associated conditions.

Out of these thirty-two cases about one half presented some noteworthy features. I will first call attention to some cases in which the lung affection had apparently led to changes in the heart; in one or two of which, in fact, the original disease was masked by the secondary symptoms due to that organ.

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CASE 1.—*Chronic phthisis. Dilatation with hypertrophy and induration of right ventricle of heart. Tubercles in liver, kidneys, &c. Ulceration of intestines.*

Male, æt. 42, a lighterman. In hospital thirty-six hours. Weather cold. Examination twelve and a half hours after death. Body of a strong, muscular man.

Thorax.—Right pleura containing about 7 oz. of clear, serous fluid. Left pleura generally adherent by firm, thickened fibrous membranous layers, which are thickest over the upper lobe, where they form a layer about $\frac{1}{16}$ inch in thickness.

Lungs.—Right, weighing 37½ oz.; left, 36 oz. The *left* lung considerably contracted, this being apparently due to its firm investment of dense, fibrous tissue. Bronchi contain much frothy blood-stained fluid; their mucous membrane congested, but free from ulceration. Upper lobe of lung extremely dense and tough; on section it appears to consist of closely-packed, greyish and yellowish granulations and small caseous masses, surrounded by deeply pigmented, tough, fibroid tissue. Only one or two cavities in this lobe, neither of them so large as a marble, of irregular shape, with tough walls, and filled with caseous substance. The lower lobe thickly packed with greyish, opaque white and yellowish granulations, many of them of racemose arrangement, corresponding with the division of bronchi, with much dense pigmented fibroid tissue between and around them. The remaining pulmonary tissue of a deep, brownish-red colour, with much scattered pigment, dry and tough. *Right* lung in a state of full expansion, large, much consolidated throughout; but the consolidation chiefly limited to the upper and middle lobes, which present much the same appearance as the left lung, but the granulations more distinctly racemose in their arrangement, and obviously disposed around the terminal divisions of bronchi. Pigmentation less marked than in the left lung. Lower lobe fully expanded, with scattered masses of granulations; the intervening tissue deeply congested, and exuding much frothy, blood-stained fluid on squeezing. The bronchi contain blood-stained, frothy mucus.

Bronchial glands large; on section white and opaque, some in process of caseation.

Pericardium containing 1½ oz. of clear, serous fluid.

Heart of large size, weighing 16¼ ozs. On opening the thorax

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in the usual manner, the left lung was scarcely visible, the heart being much uncovered, and its apex lying opposite the upper border of the seventh rib in the axilla. On opening the pericardium the right ventricle and auricle were almost solely visible. Right auricle considerably dilated, containing a large mass of dark clot. Some adherent decolorised coagula in auricular appendix. Wall of auricle thick and tough. Right ventricle much dilated, of square shape as viewed from the front; at its base and along the conus arteriosus considerably dilated, the cavity bulging upwards in front of the auricle. The wall of the ventricle thick, measuring a quarter of an inch in its thinnest part, with also much hypertrophy of the columnæ carneæ and musculi papillares. Its substance somewhat paler than natural, but free from fibrous striæ, torn with great difficulty, very firm and tough. Auriculo-ventricular orifice apparently dilated, but the tricuspid valve closes fairly under a forcible stream of water, allowing only some regurgitation at one angle; one of its flaps slightly thickened at the margin. Mitral and aortic valves normal; left ventricle slightly dilated and hypertrophied. Lining membrane of pulmonary artery thickened and somewhat opaque; a few small patches of atheroma at the point of its secondary divisions in the lung.

Liver.—Weight 60 oz.; firm, slightly fatty, with slight congestion here and there. A few scattered minute grey granulations on surface and in capsule, and some of yellowish colour scattered through its substance.

Spleen also containing a few granulations.

Kidneys large, smooth, weighing 10½ oz. Capsule readily separated, surface smooth, substance tough, edge of section sharp and firm. Numerous tubercular granulations scattered throughout the cortical substance, each surrounded by a slightly vascular zone, some confluent.

Intestines, with a few small, irregular ulcers with thickened margins, in caput cæcum coli, and some follicular ulcers, not larger than a split pea, with thick edges, in ileum.

Other viscera normal.

I have detailed this case at some length because it was a typical one. The dilatation and induration of the right ventricle gave rise to symptoms which simulated those due to dilatation from emphysema and bronchitis. I may note that in the use

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of the word "granulation" I attach no specific meaning to it as applied to the minute nodules in the lung; it serves well to denote the naked-eye characters; but the most marked tubercular or lymphoid growth in this form of phthisis I have always found in the surrounding tissue, the greyish, whitish, or yellowish and semi-caseous spots being of very various nature.

The next case is one of similar character: in this the symptoms observed during life were so markedly cardiac that the condition of the lungs was not suspected.

CASE 2.—*Chronic phthisis, dilated right side of heart; "nutmeg" liver; ascites; indurated kidneys.* In hospital six weeks. Male, æt. 55; a carpenter.

Post mortem twenty-six hours after death. Very slight icteric tint of skin, &c. Legs anasarcous. *Left lung* generally adherent, and somewhat contracted; weighing 25 oz. Bronchi containing frothy, slightly blood-stained fluid, their mucous membrane much congested. Upper lobe contains an irregular cavity the size of a walnut, with extremely dense fibroid walls and surrounding pigmented induration. Lower lobe with numerous scattered granulations, mostly greyish and pigmented. *Right lung* weighs 31 oz., in upper lobe much solidified, with irregular nodulation on the surface. On section this lobe, consists almost entirely of small greyish and yellowish granulations, surrounded by fibroid tissue; a few small cavities communicating freely with large bronchi. Middle and lower lobes congested and œdematous.

Heart weighs 10½ oz. Right ventricle much dilated, its pericardial surface presenting numerous milky-white patches; its wall extremely flabby and soft. Right auricle much dilated and thin. Left auricle and ventricle natural, but muscular substance soft and friable. Mitral flaps slightly opaque and thickened. Aorta atheromatous; some atheroma of coronary arteries.

Peritoneal cavity containing 22½ pints of clear fluid; the membrane slightly opaque.

Liver small, pushed down by accumulation of fluid above it, weighing 54 oz. Capsule slightly thickened and opaque. Surface of mottled, dark red colour; very slightly irregular. Gall-bladder and bile-ducts normal, the bile passing readily into the duodenum. Liver substance of typical "nutmeg"

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appearance on section, with portal and hepatic congestion, and fatty degeneration with bile-staining.

Kidneys with signs of chronic congestion.

In this case it seems pretty clear that the condition of the lung was the primary cause of the dilatation of the right side of the heart, which, in its turn, led to congestion of the liver and secondary changes in that organ, and also to the ascites. It may perhaps be questioned whether the pulmonary changes were not themselves secondary to chronic bronchitis; and whether the various tissues of lungs, heart, and liver might not be due to one common cause, viz. alcoholic excess; these I cannot now stop to discuss; but there appear to me to be strong arguments against both of these views. The clinical interest of the cases lies in the fact that in both of these the symptoms were ascribed to primary cardiac changes. A third case of fibroid phthisis in a young man also deserves a note.

Case 3.—Male, æt. 24, a labourer. Examined thirty-six hours after death. Legs and scrotum œdematous.

Lungs, right, weighed 25 oz.; left, 28½. Right generally adherent, with three or four contracted cavities containing caseous material, and surrounded by a layer of dense fibrous tissue, with fibrous bands radiating from them into the surrounding lung tissues, and causing deep puckerings on the surface on removal. Left with one or two similar cavities in upper lobe. The rest of the lung tissue œdematous and congested.

Pericardium containing 1½ oz. of fluid; some fibrous thickening over right ventricle.

Heart of large size, weighing 16 oz.; the enlargement almost entirely due to that of the right side. The right ventricle measures six inches from base to apex, and eight inches in semi-circumference at the base; the cavity much dilated and walls thick. Right auricle also considerably dilated. Left ventricle somewhat enlarged. Valves normal.

Liver deeply congested.

Kidneys large, pale; not staining with iodine.

In three other cases the heart presented a similar condition of hypertrophy, with dilatation affecting chiefly the right side. In one the heart weighed 12½ oz. in a male, æt. 40, only one lung being affected with fibroid phthisis, the other lung entirely

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free from all signs of phthisis. In another case, a male, æt. 52, where both lungs were nearly solid, with much fibroid change and some cavities in the upper lobe of the left, the heart weighed 16 oz. and was much dilated. It should be added that the kidneys were healthy. The weight of the heart is in all cases that of the heart alone, after opening and removal of all coagula. One of the cases presents some peculiar features which lead me to give it in more detail.

Case 4.—Male, æt. 19, a house decorator. In hospital eleven weeks.

Right pleura, with old, somewhat firm, fibrous adhesions. Left, with similar adhesions, especially firm at the apex.

Right lung weighing 28 oz. Upper lobe almost completely solid, and covered by a layer of thickened pleura of fibro-cartilaginous consistence. The lung tissue itself converted into a mass of dense fibrous tissue, with radiating broad, white, fibrous bands, enclosing one or two small vomicæ, apparently due to dilated bronchi. Bronchi much dilated, and mucous membrane much inflamed; one or two small cavities communicate freely with them, possibly due to dilated bronchi. Middle lobe somewhat emphysematous, pale, studded with numerous greyish-white, semi-transparent granulations. Lower lobe containing only a few scattered pigmented granulations.

Left lung weighed 28½ oz. At the apex of the upper lobe were some old fibroid indurations, containing a few small cavities. Middle and lower lobes containing only a few scattered pigmented granulations. Lower lobe throughout semisolid, with numerous patches of superficial collapse in various stages of congestion. On section the lower lobe deeply congested, exuding opaque, frothy red fluid on squeezing; portions nearly sink in water; numerous patches of collapse and broncho-pneumonia scattered through the whole. Bronchi generally inflamed.

Heart weighing 13 oz., of peculiar rounded shape, the conus arteriosus considerably dilated; the right ventricle generally dilated, its walls much thickened and tough. Left cavities and valves normal.

Liver somewhat atrophied, otherwise normal.

Spleen small, soft.

Kidneys large; weight 13 oz.; capsule adherent, separating

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in layers; cortical substance thickened, both in the superficial and interpyramidal portions; Malpighian tufts distinct, but not prominent; no staining with iodine; kidney substance tough.

Other organs normal.

The condition of the kidneys closely resembled that often seen in cases of long-standing mitral disease. It is difficult to believe that any thing other than the condition of the lungs can have given rise to the change in the heart. Death was obviously due to an attack of broncho-pneumonia.

To these cases I may add another, which came under observation whilst writing these notes, and which is even more characteristic. The case presented many features of interest, but I give only those relating to the condition of the lungs and heart.

Case 5.—Male, æt. 24. Body of a strongly-built man, somewhat, but not greatly, emaciated.

Pleura.—Right, with very firm adhesions over the whole surface of the lung. Over the upper lobe of the lung the pleura formed a layer of fibro-cartilaginous consistence, measuring two or three lines in thickness, very firmly adherent to the costal wall, and separable only by cutting. It was also firmly adherent to the lung, and fibrous bands passed from it here and there into the lung tissue. Over the middle and lower lobes the pleura was also a good deal thickned, measuring about one line in thickness, and firmly adherent to the thoracic walls and diaphragm. Left pleura also adherent at the apex, over an area one inch in breadth.

Lungs.—Right weighed 40 ozs.; its upper lobe dense, contracted, consisting almost entirely of deeply-pigmented fibroid tissue, surrounding enormously dilated bronchi. The fibroid tissue contained numerous minute greyish-white or yellowish granulations, some of larger size and caseous; one cavity, three quarters of an inch in diameter, in the centre of the lower part of the lobe, filled with inspissated caseous material; this cavity had a dense, fibrous wall, nearly smooth on its inner surface, but not continuous with a bronchus. The bronchi enormously dilated, their terminations forming digitate pouches at the superficial parts of the lung. Mucous membrane especially

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in these pouches intensely congested. Middle lobe contained scattered clusters of granulations, with densely pigmented fibrous tissue in the centre of each cluster. Lower lobe with only one or two scattered clusters, the remainder of the tissue presenting only signs of recent congestion. Bronchi of middle and lower lobes very slightly congested.

Left lung, weight 31 oz., with a small patch of induration, formed by similar clusters of granulations, with much pigmented fibroid tissue at apex. Scattered clusters of similar character here and there on remainder of upper lobe, the anterior border of which is slightly emphysematous. The lower lobe with recent congestion and œdema. Bronchi free from signs of inflammation.

Pericardium normal.

Heart of large size, weighing 12 oz., and of very curious shape, due to dilatation of the right ventricle. This formed almost the whole of the anterior surface of the heart, and projected considerably beyond the left ventricle at the apex, which was consequently slightly bifid. The ventricle was of elongated, conoid shape; its apex elongated and somewhat rounded; the lower border, which is usually nearly straight, having a convex outline. The upper border in front reached considerably above the level of the left ventricle, the cavity of the ventricle being pouched up in front of that of the auricle; the conus arteriosus was greatly dilated, and of remarkable width. The difference in size of the two ventricles may be judged by the following measurements:

Right ventricle, from upper border of ventricle to apex		5 inches.
Left ditto ditto		3¾ „
Superficial circumference at widest part, measured from anterior to posterior sulcus	Right	7½ „
	Left	4 „

The right auricle somewhat dilated, but not at all in proportion to the ventricle. Left auricle and ventricle of about normal capacity; valves normal.

The cavity of the right ventricle was much dilated and elongated, of pyramidal shape. The wall measured one quarter of an inch at its thinnest parts, and from one quarter to three eighths elsewhere. The tricuspid and pulmonary valves appeared healthy, and closed as well as usual with a stream of water.

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Orifices: tricuspid measured four and a half inches in circumference; pulmonary, three and a quarter inches.

It may be added that there was tubercular disease of the intestines and the liver, of both testicles, and of the prostate and bladder, in the form of grey granulations, and of caseous deposits and ulcers, but these do not concern the present subject and need not be detailed.

In this case there are only two conditions which could be considered at all likely to give rise to the dilatation and hypertrophy of the right ventricle, viz. the chronic phthisis, and the adherent and thickened pleura, the causes usually ascribed, viz. emphysema and chronic bronchitis, being almost entirely absent here. It is of course a matter of some difficulty to decide how much may be due to either of these factors. But against the view that the thickening and adhesion of the pleura was the sole cause, it may be urged that this condition exists in many cases to an equal, or even greater, extent than in this, without producing any dilatation of the right ventricle; and, on the other hand, in some of the cases here related, the fibrous thickenings of the pleura were limited to the apex of the lung, yet the hypertrophy and dilatation of the ventricle took place.

There can at any rate be no question that anything which impedes the expansion and contraction of the lung, which plays so great a part in aiding the pulmonary circulation, does *pro tanto* throw a greater amount of work on the right ventricle, and thus tend to induce dilatation with or without hypertrophy; and if the hypertrophy is insufficient to overcome the obstruction, congestion of the lung tissue and consequent œdema occurs. The action of simple adhesion of the pleura, even where the lung is merely bound to the thoracic wall by a membranous layer, is shown by the commonly observed fact that where one lung is thus adherent and the other free, the adherent lung will usually be found more or less congested and œdematous after death; or if both are so, the adherent one will show an excess of this condition.

Now, whatever impedes the flow from a hollow viscus will, we know, tend to produce dilatation, and this dilatation is proportioned not only to the amount of obstruction, but to the time of duration of its operation; and whilst a serious obstruction to outflow will often produce dilatation and hypertrophy of the

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nearest to the seat of obstruction, a slight obstruction may produce it only at a distance. For example, in some cases of very slight stricture of the urethra of long standing, the bladder may be comparatively free from dilatation and hypertrophy, and the ureters remain undilated through a great part of their course, yet the pelvis and calyces of the kidney may be dilated to such an extent as to induce almost complete atrophy of the renal tissue. Of this condition several well-marked examples have recently come under observation.

As I have said, I do not think it possible to differentiate the effects of the induration of the lung tissue from those of the adherent pleura, but since these are invariably associated in this form of phthisis, it is of the less importance to attempt to do so. The fact remains that the long-standing, though slight, obstruction to the pulmonary circulation does give rise to hypertrophy or dilatation, or both combined, of the right ventricle, and that this may lead to a fibroid induration of its walls, with consequent dilatation, or be followed by fatty degeneration and its results.

I have dwelt longer on these facts, which are no doubt very simple, because I find that the possibility of hypertrophy or dilatation of the right ventricle resulting from phthisis is not generally recognised or accepted. It is no doubt true that the heart generally wastes in phthisis of the more rapid forms, and that even where throughout the greater part of the tissue of both lungs the circulation is obstructed, no hypertrophy or dilatation occurs. The heart, in fact, wastes with the other tissues, the obstruction is not of long enough duration to produce hypertrophy: the quantity of blood is probably diminished with rapidity equalling the restriction of the area of circulation: and there is therefore less tendency to dilatation.

Yet there are certain facts which seem to me to show that it is not improbable that in the earlier stages of phthisis some hypertrophy of the right ventricle may occur. Notably there is the fact, that in many cases when the consolidation of the lung is limited to a small part of the lung, the second sound of the heart is doubled at the base, the pulmonary second sound being delayed, in consequence of the increase of tension in the pulmonary artery. There is then a greater amount of work for the right ventricle to do; and, from all that we know, it is probable that some

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compensatory hypertrophy will occur. It is possible that the hepatic and gastric congestion from which so many patients in the earlier stages of phthisis previous to excavation suffer, may in some degree be capable of a similar simple mechanical explanation, being, in fact, the effect of a slight, but continuous, obstruction, to the circulation in the right heart.

The object and scope of the present notes forbid anything like a detailed examination of the views of various authors on this question. But one or two references may be made to those who have specially observed it. Louis, whose observations on phthisis retain their value in spite of the change in the views on the nature and relations of tubercle to the disease, states that of 112 fatal cases of phthisis, the heart was increased in size in only three, and that the left ventricle was the part affected. Only once did he observe abnormal thickness of the walls of the right ventricle, and in that case it was apparently due to contraction only. Louis also pointed out that the wasting of the heart was much the same in other chronic diseases as in phthisis; and that in fact the proportion of much wasted hearts was higher in a series of other chronic wasting diseases, especially in cancer.[1] Dr. Peacock has also found that the weight of the heart in phthisis is greater than in other chronic diseases, and he remarks that there is certainly nothing in phthisis which prevents the heart from becoming considerably hypertrophied when the tuberculous affection is combined with efficient causes of obstruction. Space forbids any further reference to his observations on the subject, but I would refer to his valuable original paper for further details on this and other points.[2]

Dr. Austin Flint, in his recent work on 'Phthisis,' states that in only five out of eighty cases of phthisis was the heart increased in size and weight. In one of these the enlargement was due to recent pericarditis; in another to aortic valvular disease, the left side being alone affected; in the third the enlargement was slight and the organ flabby; in a fourth there was old collapse of the lower lobe of the left lung, with dilated bronchi, and no valvular disease of the heart; and, lastly, in one case, the enlargement was limited to the right side, but there was

[1] Louis on 'Phthisis,' Syd. Soc. Trans., p. 48.

[2] "On the Weight and Dimensions of the Heart in Health and Disease." 'Monthly Journ. of Medical Science,' 1854.

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atrophous emphysema of the lungs. Hence he concludes that when enlargement occurs it is due to causes independent of the lung consolidation.

Dr. Hayden, in his recent work on diseases of the heart, states that hypertrophy of the right ventricle, even in a moderate degree, is rare; nor does he mention it as occurring in cases of phthisis; and other authorities, not to quote further, either do not mention its occurrence in phthisis, or deny its connection with the lung disease.

With regard to the statistics of Louis and of Flint, it may be observed that they were in all probability taken from cases of well-marked phthisis dying from the disease, and not from a mixed series of cases in which the cause of death might or might not be the disease of the lungs. In some of the cases which I have related the phthisis was not known to exist, or was regarded as quite secondary in importance to the complications for which aid had been sought; and this fact must not be overlooked in estimating the value of the statistics.

One fact which I have passed over almost entirely was the existence of atheroma in the branches of the pulmonary artery. It is well known that this occurs in many cases of long-standing chronic bronchitis to a slight degree, and is in most cases probably due to the increased strain on the walls of the vessels. I should not refer to this but that atheroma of the pulmonary artery has been said to be the *cause* of hypertrophy of the right ventricle; if this be true, however, the atheroma must be far more extensive than in any of the present cases, and I should be inclined to invert the sequence of causation.

I might add that, apart from the supposed rarity of the association of hypertrophy and consecutive dilatation of the right heart with phthisis, the subject is of interest with reference to diagnosis and prognosis. I have seen two or three cases of sudden death in this form of phthisis associated with dilated and fatty heart; and in respect of prognosis also there appears to me to be an essential difference between this and the disease which most closely resembles it clinically, viz. chronic bronchitis with dilated right heart; but in so far as treatment is concerned, there is perhaps less difference.

Two cases of sudden death from hæmoptysis present features

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of interest. One was a case of diabetic phthisis, the other was admitted moribund, and nothing could be ascertained about his history.

Case 1.—Male, æt. 15. Diabetes of about seven months' duration at death. Body extremely emaciated.

Right lung adherent at apex; bronchi, especially those of upper lobe, full of fluid blood. The upper, middle and lower lobes are fused together, nearly all trace of the interlobar fissures being lost. At the apex is a large cavity nearly filling the upper lobe, and passing down behind the root of the lung, with very thin walls, nearly perforated at one point. This cavity communicates freely with several large bronchi. There are also several smaller cavities in the middle lobe. On further examination it was found that in the wall of the cavity near the root of the lung, a large branch of one of the pulmonary veins was laid bare and eroded for half an inch; at the centre of this erosion was a small, rounded aperture, admitting a probe readily, through which the hæmorrhage had occurred. All these cavities are filled with blood, partly coagulated; their walls are ragged and ulcerated. Lower lobe contains numerous small, softening broncho-pneumonic patches.

Left lung much consolidated throughout, infiltrated with scrofulous pneumonia, with numerous rapidly softening patches and small cavities. Some blood in larger bronchi.

Case 2.—Male, age doubtful, probably about 50.[1]

Pleura.—Strong, fibrous adhesions at both apices, forming the anterior walls of cavities in upper lobe.

Lungs.—Both very fully expanded, especially the left, the lower lobe of which was very fully inflated and apparently emphysematous. Small patches of hæmorrhage were visible through the pleura, scattered through the superficial parts of the lungs. *Left lung* weighed 22½ oz. Its upper and the upper parts of its lower lobe, with the exception of the anterior border, were almost completely consolidated with a nodular pneumonic consolidation, limited at its lower margin by an almost abrupt horizontal line. On the outer side of the upper lobe a cavity, the size of a small orange, with rugged, vascular walls and numerous vessels passing across it, and lying free on the walls.

[1] This patient was brought in dead or just dying, having been seized with sudden hæmoptysis whilst walking over Westminster Bridge.

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Another thin-walled cavity at apex, surrounded by œdematous tissue, and communicating freely with a bronchus. In the upper part of the lower lobe a small rounded cavity, about one inch in diameter, full of recent blood-clot. On its posterior wall were two fibrinous plugs, about one twelfth of an inch in diameter, which, on examination, were found to project from a divided branch of the pulmonary artery. Bronchi containing much blood. *Right lung* also with numerous cavities in upper and middle lobes, and clustered, indurated patches in lower lobe.

Stomach containing a quantity of black fluid with undigested food, and some small blood clots.

These two cases are of interest from the suddenness of the fatal issue and the discovery of the source of hæmorrhage, in one from ulceration of a branch of the pulmonary vein, in the other of the artery.

A case of unilateral phthisis (in addition to the one already referred to), fatal from acute lobar pneumonia, is deserving of note, as of rare occurrence. In the absence of history, it is difficult to say whether it may not have originated in broncho-pneumonia.

Case 221.—A. R—, female, æt. 42. In hospital three days.

Post mortem twenty-seven hours after death. Body greatly emaciated.

Right lung weighed 43½ oz.; *left*, 24 oz. The *right* lung in a state of full expansion and solidified throughout its whole extent. On section the tissue presents similar characters throughout, is of a pinkish-grey colour, studded with yellowish-white patches of "broncho-pneumonic" character, many of which are softened or caseous. In some parts of the lung the appearance closely resembles that of ordinary acute broncho-pneumonia going on to softening and destruction of the lung tissue; but in others the characters are those of ordinary acute phthisis. The upper lobe contains a cavity the size of a small apple, full of grumous pus; numerous other smaller cavities being scattered through the upper and middle lobes.

Bronchi much inflamed, containing puriform fluid.

Left lung somewhat emphysematous; upper lobe œdematous; and on careful examination no trace of consolidation or tubercle to be discovered in it. Lower lobe in its upper half of deep red

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colour, partially solid; the tissue breaking down readily, and exuding some turbid, blood-stained fluid on squeezing. The condition precisely resembled that of red hepatization of acute pneumonia. Towards the posterior part the consolidation more marked, and with greyish-white, granular patches. Lower half of the lobe congested and œdematous.

Kidneys weighing 15 oz.; large, pale, capsule readily separated, cortex slightly thickened and somewhat opaque. No staining with iodine. The condition of the kidneys precisely resembled that frequently seen in acute pneumonia and in fevers. Other organs presented nothing noteworthy. Microscopically the condition of the right lung did not appear to differ from that usually found in acute phthisis.

Three cases of phthisis were associated with caries of bones, or white swelling, an association of some interest in its bearings on the relation of tubercle with these affections.

Case 1.—Male, æt. 32. A carman. In hospital two months with caries of metatarso-phalangeal joint of right great toe.

Post mortem.—Body much emaciated. A small sinus over the metatarso-phalangeal joint, leading down into the joint, the bones entering into which, but especially the metatarsal, extremely carious; the joint completely disorganized.

Pleuræ.—Both generally adherent.

Lungs—Right, weighing 27½ oz., consolidated throughout almost the whole of the upper lobe, which, on section, is filled with masses of racemose granulations, white or yellowish, rapidly softening. Several small cavities, about the size of a hazel-nut, and one the size of a walnut at the apex. Middle lobe also infiltrated with similar masses of rapidly softening granulations; lower with a few scattered masses, the intervening tissue pale and somewhat emphysematous. *Left* lung weighs 20½ oz. Upper lobe with some old pigmented fibroid tissue at apex, the remainder infiltrated similarly to the right lung. Several small cavities in upper lobe containing puriform matter, their walls soft and irregular, with rapidly proceeding disintegration of the surrounding tissue. Lower lobe congested, with masses of granulations of typical broncho-pneumonic arrangement. Bronchi free from all signs of congestion or inflammation, containing only a little muco-purulent fluid.

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The *intestines* contained three or four patches of ulceration of typical tubercular character in the lower eighteen inches of the ileum, each affecting a Peyer's patch; the ulcers of irregular rounded shapes, their base and walls containing numerous small, yellowish nodules scattered through them; the peritoneum covering them thickened, with a deposit of organized lymph on the surface. From the ulcers radiate irregular lines of whitish colour in the submucous tissue, which resemble vessels filled with cheesy matter, raised above the surface, and hard to the touch; they do not, however, run circularly round the bowel in the usual way, but in an irregularly branched manner.

Kidneys.—Left much larger than right, of somewhat irregular and lobulated form. Its capsule adherent; surface smooth, pale, with numerous whitish and yellowish points scattered over it, each surrounded by a zone of injection. On section, the pelvis of the organ somewhat dilated, and filled with turbid urine mingled with pus. Each of the pyramids converted into a soft, caseous mass, the disease either involving the whole of the pyramid and a part of the adjacent medulla, or limited to the papilla and part of the pyramidal portion. Some of the papillæ completely destroyed by ulceration. Radiating outwards from these into the cortical substance were tracts of tubercular infiltration, and the remaining cortical and medullary substance were filled with granulations of various shape and size.

Left ureter greatly enlarged, measuring half an inch in diameter; its canal dilated; and on the mucous surface numerous roughened, ulcerated patches, encrusted with phosphatic deposit. The coats all considerably thickened, and in some places the canal considerably narrowed by the thickening and ulceration.

Right kidney scarcely larger than normal. On section there is a diseased condition resembling that of the left; the pyramids entirely destroyed by tuberculous infiltration and ulceration, and forming caseous masses; some of the calyces dilated so as to form cysts. The cortical portion of the organ much altered, bloodless, and of uniform greyish, translucent colour on section; the glandular elements apparently atrophied, leaving only fibrous remains.

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Right *ureter* nearly impervious, free from ulceration and thickening.

Bladder.—Walls greatly thickened, cavity small, very irregular in shape. The whole of the mucous surface presents a mass of ragged ulcerations, with great infiltration and thickening of the walls; in many places the mucous membrane completely undermined and tunnelled by sinuses, bundles of thickened tissue passing across them, encrusted with phosphates. At the base of the bladder are two other sinuses leading into surrounding parts; one of these, admitting the little finger, passes directly backwards into the rectum. The right *vas deferens* throughout its whole course thickened, ulcerated, and filled with thick, purulent matter; right epididymis enlarged, containing softening caseous masses; body of testicle healthy. Left not examined.

Large intestines.—Cæcum with two or three small, irregularly rounded ulcers with thickened edges. Rectum: at two inches from the anus, on the anterior wall, a patch of intense congestion of the mucous membrane, two inches in length and one inch in width, extending circularly around the bowel; in the centre of this is the rounded opening communicating with the bladder. On a level with this, on the posterior wall, are two rounded patches, also the seat of intense congestion of the mucous membrane, which is of a livid purple colour; in the centre of these patches some "tuberculous" ulceration.

Other organs present nothing noteworthy. No waxy degeneration of liver or spleen.

In this case we must admit at least two distinct starting-points of tubercular disease, the lungs and the kidneys, even if the affection of the bowels and of the bladder be regarded as secondary; and I would remark that the term strumous, scrofulous, or tuberculous "pyelitis," appears to me to be inapplicable to the condition of the kidneys described in this case. So far as I have been able to trace the course of the affection, it appears usually to commence by the growth of grey granulations in the centres of the pyramidal portions of the kidneys, which become confluent and degenerate in the usual way, the diseased process extending from this starting-point inwards towards the pelvis, and outwards towards the cortical substance; the affection of the remainder of the genito-urinary

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tract usually resulting from a process of secondary local infection.

The second case I will relate only briefly.

Case 2.—Female, æt. 18; a servant. Amputation of thigh for white swelling of the knee, stump unhealed at time of death.

Lungs, right, weighed 20 oz.; left, 24 oz.; both firmly adherent, small, and contracted. Upper and middle lobes of *right* almost solid, very little normal lung tissue seen on section; the whole infiltrated with clustered, yellowish, racemose granulations, imbedded in greyish, semitranslucent tissue. Towards the surface there is softening of these masses, many caseous, others quite softened, forming a series of small cavities, actual or potential, lying very close beneath the pleura; this condition found all over upper and middle lobe, no cavities in the deeper parts of the lung. Lower lobe, tissue inflamed, and studded with minute, opaque, greyish granulations. *Left* upper lobe solid, puckered, riddled with cavities of various size; lower lobe greatly congested, studded with minute, opaque granulations.

Bronchi of both lungs inflamed, filled with puriform fluid.

Pericardium with numerous minute granulations studded over visceral layer, each covered by a thin layer of lymph.

Brain.—Much subarachnoid and cerebro-spinal fluid. No lymph at base, and no grey granulations there or along Sylvian fissures. On the upper surface of the left hemisphere a small quantity of recent lymph; and on separating the pia mater this was found to be chiefly over a small caseous nodule, which extended for about half an inch into the substance of the brain. Another nodule, the size of a pin's head, found near it.

Uterus and *Fallopian tubes* full of caseous material; on microscopic examination, Dr. Cory found tubercle of the submucous tissue.

Other organs present nothing abnormal.

The third case was one in which death occurred soon after resection of the hip-joint for caries in a child 6 years of age. Death appeared to have resulted from thrombosis of the vena cava inferior, secondary to phlebitis of the external saphenous vein, the coagulation having extended upwards into the femoral and external and common iliac veins and vena cava. Both lungs were nearly solid, infiltrated with rapidly softening clus-

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ters of yellowish or white granulations, with a good deal of pigmented fibroid tissue in the upper lobes. The peritoneum contained numerous grey granulations, and there were also some in the liver, and numerous tubercular ulcers in the small intestines.

It is needless here to enter into a discussion of the connection of these various lesions, the association of which is now well recognised; whether we regard the bone and joint affection as due to tubercle, or the visceral tuberculosis as secondary to the bone diseases, or both to a scrofulous diathesis, the association is far more commonly found in the post-mortem room than is apparently suspected during life. In the majority of such cases which have fallen under my own observation the form of phthisis has been usually a very acute one, characterised by rapid softening of the deposit in the lungs and the formation of numerous cavities, and there has also usually been tubercular disease of the bowels, and often also of the genito-urinary tract. I might relate numerous cases in support of these statements, but those given, especially the first and second, are sufficiently characteristic.

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TUMOUR OF THE LIVER

(PROBABLY HYDATID),

SIMULATING

PYLORIC DISEASE AND TERMINATING IN ABSCESS.

By W. S. WYMAN, M.D., F.R.C.S.

A. B., æt. 63, who had previously enjoyed good health, and had never suffered from any serious illness, first came under my notice in March, 1873. He then complained of general malaise, pain in the right hypochondrium, and vomiting; the bowels were rather confined, and there was absence of bile in the stools. There was not any material constitutional disturbance. On examination the hepatic dulness was increased, and a globular swelling, the size of a small egg, could be felt beneath the margin of the ribs, in the situation of the gall-bladder. The swelling gradually increased in size and became more painful, but no fluctuation could be perceived in it. He was seen by several physicians, who all agreed in regarding the swelling as probably an abscess, though they differed as to its precise seat.

After this, however, there was an improvement in the symptoms, the swelling rather diminished and became less tender, and on June 19th he was able to go to the seaside for some weeks, and returned home much better; but some time after his return the swelling began again to enlarge and became more painful, and he suffered from sickness and diarrhœa, which, though relieved by remedies, continued to trouble him.

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On November 18th the swelling had slightly altered its situation, being more in the pyloric region, and the symptoms also seemed to indicate that there might be some obstruction at that end of the stomach; the food was retained for some hours, and was then vomited with very little effort in a partly digested state, and the stomach was very greatly enlarged, extending below the umbilicus, and filling up a large part of the left side of the abdomen. After this he gradually improved, the sickness especially being less during January, February, and March, and although not quite so well in April, he soon recovered, and continued in much the same state until July, when the vomiting again returned, the pain became more severe, the swelling rapidly increased in size, and ultimately occupied nearly the whole of the right half of the abdomen, being apparently continuous above with the liver, and extending below almost to the crest of the ileum. Fluctuation could be distinctly felt in it. On August 5th there was a distinct tendency to point, and the abscess was therefore punctured by a trocar just above and behind the anterior superior spine of the ileum, and about forty ounces of most fœtid pus was evacuated, and a drainage tube was inserted. The pus was thick and of a dirty brown colour, and was found to contain numerous shreds of membrane, which to the naked eye resembled the débris of hydatid cysts. A microscopical examination of the fluid and membranes showed only disintegrated blood and corpuscular matter, and a granular membrane in which no lamination could be distinguished, nor were any hooklets of *Tænia echinococcus* found. Dr. Peacock had no doubt at all at the time as to the hydatid nature of the membranes, and the absence of positive microscopical evidence may be fairly attributed to the extensive suppurative degeneration undergone by the cyst.

At the time of the evacuation of the matter he was excessively prostrated, but the operation was attended with immediate relief. The drainage tube was retained in the cyst for a fortnight, and matter continued to discharge for three or four weeks after it was removed, the pus becoming more and more healthy. No distinctly bilious fluid was at any time discharged. The appetite meanwhile gradually improved, the cavity contracted. He soon got well, and has remained so ever since, and is at the present time very active. During the

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whole period of the illness the temperature was not much above the normal standard.

The case is interesting from the close resemblance which it presented to disease of the pyloric end of the stomach, at one time causing, by its pressure on this part, an almost complete obstruction to the exit of the contents of the stomach. Indeed, an eminent physician who saw the patient shortly before the swelling began to enlarge, and while it was very hard, was disposed to entertain the idea of malignant disease (the family history pointed to cancer). Dr. Peacock, who saw the patient with me at the time the puncture was made, mentioned having seen a somewhat analogous case, but in that instance the tumour never suppurated, but burst into the stomach. The patient, a young man, was sent up to St. Thomas's Hospital by Mr. Penhall, of St. Leonard's. He laboured under constant vomiting, so that his food could not be retained for any time, and though repeated examinations were made, nothing could be detected which at all explained the symptoms. After various means had been tried without any relief, he left the hospital and returned home, very much exhausted and emaciated. Some time after, in going down stairs, he slipped and fell down several steps; he was much shaken, and shortly after he vomited blood, and what he described as small bladders; after this had continued for a few days he began to rally, recovered his appetite and power of retaining food, and got quite well. A year or two after he was seen, and then there was a large tumour, evidently a hydatid cyst at the upper part of the left side of the abdomen. The subsequent history of the case was not known.

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SOLANUM DULCAMARA

AS A MEDICINAL PLANT.

By JOHN HARLEY, M.D., &c.

The following is a contribution to the elucidation of a plant which still retains a place in the Pharmacopœias of Great Britain, of France, of Germany, and of the United States.

On the 26th August, 1867, Mr. Buckle, of Gray's Inn Road, expressed for me the juice of thirty-four pounds of fine plants grown in the northern outskirts of London.

The plants were laden with green fruit, and were destitute of roots. The quantity of juice obtained was seventeen imperial pints, weighing twenty-one pounds four ounces = 62·5 per cent. by weight, or 50 by measure. Part of this juice was converted into "*Succus*" in the manner and proportions directed in the Pharmacopœia for Succus Conii—but the precipitated matters were not separated;—and part into "*Extract.*" Ten pounds of the crude juice yielded fifteen ounces of extract. The evaporation was effected by steam heat, and the temperature was not allowed to rise above 170° Fahr.

On the 21st of September, 1869, I picked from sturdy trailing plants,[1] which grow in the full exposure to the sun on the shingly beach between West Worthing and Goring, in Sussex, forty-two ounces avoidupois of fine, ripe, mucilaginous, thin-skinned berries. They were pulped the same day and mixed in a stoppered bottle with proof spirit acidulated with 2½

[1] Var. γ *marinum*, Babington.

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per cent. of dilute (10 per cent.) sulphuric acid, and allowed to macerate for several months at the ordinary temperature of the air. After percolation and exhaustion of the marc, fifty-four fluid ounces of a bright rose-red "*Tincture*" were obtained.

The addition of a trace of sulphuric acid was intended to facilitate the extraction of the dulcamarine. This tincture was of a bitter-sweet, nauseous taste.

1. The Juice.—One fluid ounce of this represented one and a half ounce of the herb.

Obs. 1.—Mary P—, æt. 50, a tall, well-developed woman, the subject of eczema of the face and paralysis agitans of three years' duration.

Half a grain of conia taken by the mouth was followed by coneism with inability to walk for about an hour. She took two fluid ounces of the Succus Dulcamaræ, sometimes filtered and sometimes not, on several occasions. Once or twice the unfiltered juice produced a little nausea, but no other effect.

Obs. 2.—J. J. H—, æt. 19, a nervous youth, subject to flatulency and colic from weak digestion. He took the unfiltered succus in doses increased from half to two fluid ounces every other day for a month. For the next week he took two fluid ounces of the juice, once a day, twice a day, and thrice a day at 11 a.m., 4 p.m., and 9 p.m.

After each increase of the dose, and at the end of the day after the six fluid ounces were taken, I carefully examined this patient, but could discover no effects induced by the medicine. At first the patient was a little disgusted with the dark brownish-green, thick, nauseous draught, but he became accustomed to it after the first few doses, and there were absolutely no effects, either objective or subjective, beyond a feeling as if he had taken an additional glass of beer, and due simply to alcohol. For example, on the 30th of September, 1867, he took two fluid ounces of the juice at 11 a.m., and again at 4 p.m. In the evening he came up to my house, and after sitting for half an hour the pulse was 84, of good volume and power. Pupils at a measured distance from a given source of light, $\frac{1}{6}''$; directed sideways, nearly $\frac{1}{4}''$ (these were the normal measurements). The tongue and palate clean and moist. He had not felt any effects from

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his previous doses and had eaten heartily. At 8.40 p.m I gave him two fluid ounces more of the juice, and kept him sitting quietly under my observation for two hours. Although the conditions were favorable, neither somnolency, giddiness, feeling of dryness, nausea, nor, indeed, any other effect was appreciable. The pulse remained (under the stimulus of the alcohol, doubtless) at 84. The mouth and tongue were clean and wet, and the pupils unchanged.

Five fluid drachms of Succus conii produced moderate coneism of short duration in this patient. Thirty minims of Succus belladonnæ caused full atropism; the pulse attaining a maximum acceleration of 44 beats (numbering 120); the nostrils, posterior part of the tongue, the roof of the mouth, the soft palate and back of the pharynx being completely dry and glazed; the pupils dilated to ¼″—symptoms which were sustained at their height for more than an hour and then gradually declined. The action was accompanied by a little giddiness and more marked somnolency.

II. The Extract.—Thirty-three grains = one fluid ounce of crude juice.

Obs. 3.—Alfred L—, æt. 21, troubled with nervous spasm of the gullet; moderately strong, and like the former patient very susceptible of the action both of hemlock and belladonna.

He took the extract in doses increased from twenty to forty grains thrice a day, for sixteen consecutive days. I closely watched for symptoms as in the previous cases, but failed to observe any deviation from the normal condition. The patient himself, who was accustomed to observe and who would accurately describe the action of other drugs, experienced no effects.

Obs. 4.—J. W. W—, æt. 22, a weakly young man, took the extract in the same doses for six days consecutively, with the same absence of result.

III. Tincture of the ripe Fruit.—One fluid ounce represents 340 grains of the fruit.

Obs. 5.—Samuel H—, æt. 9, a fair, well-developed child, the subject of epilepsy. He took the tincture in doses increased from two to twelve fluid drachms, every other day for

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a month, without the production of any appreciable effects, immediate or subsequent.

Obs. 6.—Frederick G—, æt. 12, also the subject of epilepsy, took the tincture in doses increased from one to six fluid drachms, also without any effect.

Obs. 7.—Mary P—, æt. 50 (see *Obs.* 1), took the tincture in doses increased from four fluid drachms to two fluid ounces. The larger doses produced a little giddiness like that which she felt after a glass of gin and water, but beyond this effect the results were entirely negative.

Conclusions.—From the foregoing it appears—1. That a quantity of the juice equal to six and even nine ounces of the fresh herb may be taken daily, and for many days in succession, without appreciable effect. 2. That a quantity of the tincture equal to more than one and a half ounce of the ripe fruit, including the seeds, may be taken for a considerable time, also without appreciable effect. 3. From whence it follows that a decoction or infusion of the dried young branches of the plant (the part directed to be employed in the Pharmacopœias) is equally destitute of any active principle soluble in water, for if there were such it would be contained in the expressed juice.

These results are in accordance with those of Dunal and Fages,[1] of Frank[2] and Garrod.[3]

[1] Hist. nat. méd. et econom. des Solan., p. 71 et seq.
[2] Handb. d. Toxicologie, S. 61. 1803.
[3] Essent. Mat. Med., 4th Edition, p. 318.

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REPORT OF

THE OBSTETRICAL DEPARTMENT.

By ROBERT CORY, M.B. Cantab.

From the 1st of January, 1874, to the 31st of December, 1874, both dates inclusive, 1475 women were attended. Messrs. Boulger, Davis, Bennett, and Taylor being successively the resident accoucheurs.

Of these cases, 16 were cases of twins, 11 were cases of abortion, and 1 was a case of retroversion of the gravid uterus, where the mother died before the birth of her child. From this it is manifest 1479 viable children were born

Of these 753 were males and 722 females. In 4 cases the sex is not stated.

The fœtuses in 5 cases among the abortions were males, in 1 case female, and in 4 the sex is not stated.

Among the 1475 cases attended, 1319 were natural labours,[1] the remaining 156 fell under the following heads:

Breech presentations	22
Presentations of the superior extremities including the shoulder	8
Presentations of inferior extremities	5
Face and forehead	5
Placenta prævia	5
Prolapsed funis	3
Puerperal convulsions	3
Retroversions of the gravid uterus	2
Twins	16
Delayed labour, requiring forceps	73
Abortions	10
Contracted pelvis	4

[1] Under the term "natural labour" are included all cases of vertex presentations in which the labour was not complicated, and instrumental assistance was not required. Cases of premature labour and stillbirths are not necessarily excluded, but abortions are.

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The forceps were used altogether in 85 cases. Of the children born 43 were males and 41 females. There were 8 of these stillborn, or 9·5 per cent. Among the stillborn, however, the labour was further complicated:

In 2 cases with placenta prævia.
„ 2 „ prolapsed funis.
„ 1 case „ face presentation.

24 of the cases were primiparæ, which gives a percentage of 28·57; the general percentage among all the cases being 12·83.

The reasons given for the use of the forceps are the following:

Delay at brim	11
Delay at outlet	20
Tedious[1]	42
Contracted pelvis	4
Forehead presentations	2
Face presentation	1
Puerperal convulsions	1
Prolapsed funis	2
Placenta prævia	2

No maternal deaths occurred among these.

Version was resorted to in fifteen cases for the following reasons:

Presentations of the upper extremities including the shoulder	8
Presentation of the feet and hand (twin)	1
Placenta prævia	3
Convulsions	2
Monster birth	1

Out of these cases 9 of the children were stillborn, 2 more died within twelve hours from birth. One maternal death occurred, the case being complicated with puerperal convulsions.

Of the 1475 cases attended:

179	were 1st labours.	64	were 9th labours.
248	„ 2nd „	41	„ 10th „
207	„ 3rd „	24	„ 11th „
185	„ 4th „	9	„ 12th „
164	„ 5th „	4	„ 13th „
134	„ 6th „	6	„ 14th „
115	„ 7th „	4	„ 15th „
79	„ 8th „	1	„ 16th „

[1] The reasons are not stated in 17 cases. These, however, may be considered as tedious.

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The following table gives particulars of the cases of twin births:

No.	Age.	No. of Confinements.	Date of Birth.	Sex.		Result to Mother.	Result to Child.		Presentation.		Placenta.
				1st.	2nd.		1st.	2nd.	1st Child.	2nd Child.	
1932	31	9th	Feb. 22	F	F	R			Breech	Footling	
2006	37	5th	March 17	M	F	R	L	D	Head	Breech	Single.
2050	22	1st	April 19	M	M	R	D	L	Foot	Head ?	do.
2074	34	4th	April 9	F	M	R	L	L	Head	Head	Separate.
2095	35	7th	April 11	F	F	R	L	L	Head	Head	do.
2091	40	8th	March 19	M	M	R	L	L	Breech	Head	do.
2222	37	7th	May	F	F	R	L	L	Foot and hand	Breech	do.
2267	30	6th	June	M	F	R	L	L	Head	Head	Single.
2287	33	11th	June 12	M	M	D				Natural	do.
2302	33	6th	June 5	F	F	R	L	L	Head	Breech	do.
2406	42	7th	July 3	F	M	R			Breech	Head	do.
2798	22	3rd	Nov. 1	F	F	R	L	D	Born before seen	Shoulder	
2885	21	1st	Sept. 25	M	M	R			Head	Head	
3044	39	10th	Dec. 13	M	M	R	L	L	Head	Head	Separate.
3252	34	7th	Nov. 18	F	M	R			Foot	Breech	do.
3364	30	3rd	Dec. 11	M	F	R	L	D	Head	Breech	Single.

It may be seen that only two cases of twin-births occurred in the four months of July, August, September, and October, whereas there are 9 in the four months, March, April, May, and June.

The placentæ were separate in 6 cases, single in 7. In 3 cases the condition is not recorded.

Of the 16 cases of twin-births the children were in

5 cases both males.
5 „ „ females.
6 „ male and female.

One of the cases resulted in the death of the mother. For particulars, see Case 2006 among the reported cases.

In the following table the presentations are classified.

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Presentations.

	Among the 1447 single births.	Among the 32 twin children.	Total.
Vertex	1407	19	1426
Breech	22	8	30
Superior extremities including the shoulder	8	1	9
Inferior extremities	5	3	8
Face and forehead	5	0	5
Foot and hand	0	1	1
	1447	32	1479

It may be seen that the breech presented in 22 cases among the single births. This gives a proportion of 1 in 65·77, which is a little higher than last year, 1 in 70. In 7 of these cases the children were stillborn; that is, one child in every 3·14, or 31·81 per cent., almost the exact ratio given by Dr. T. Smith.

In the 8 cases of presentation of the upper extremities including the shoulder, occurring among the single births, 5 of the children were stillborn, or 1 in every 1·6, or 62·5 per cent.

The proportion of these presentations being 1 in every 180·88 cases, or ·55 per cent.

There are 60 cases of stillbirth to record, being in the proportion of 1 in 24·65, or 4·06 per cent. The characters of the labours in which they occurred are given below:

Natural labour	19
Premature labour	6
Instrumental labour	5
Breech presentations	9
Presentations of lower extremities	3
Presentations of upper extremities	6
Maternal syphilis	2
Prolapsed funis	2
Placenta prævia	3
Twins	4
Diseased placenta	1
	60

Besides these there were 10 cases of abortion, and two cases of retroversion of the gravid uterus; one resulting in abortion, and the other in the death of the mother before abortion occurred.

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The table on page 298 gives the cases in which the uterus was injected with a solution of ferric perchloride. They are altogether 10 in number; 9 of them, it will be seen, made rapid recoveries without a symptom of peritonitis.

The one case in which death occurred ought perhaps not to have been considered, as it was an exceptional one. See report of the cases.

The solution used was the Liquor Ferri Perchloridi Fortior, and the strength mentioned in the table refers to this as mixed with water in the proportion named.

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Cases of Injection of a Solution of Ferric Perchloride into Uterus.

No.	Age.	Confinement.	Date.	Complication.	Result to Mother.	Strength of Solution.	Condition of Mother requiring its use.
1879	25	3	March 9	...	Recovered without a bad symptom	⅛	Severe hæmorrhage immediately after removal of placenta.
1886	27	5	March 23	...	Did perfectly well	⅛	Blanched. Had fainted.
1915	27	4	March 4	...	Good recovery in a fortnight	¼	Used after ʒvj of Ext. Ergoto Liq. had been given and cold applied ineffectually. Bed saturated, and blood running over the floor.
2041	40	9	March 8	...	She got up on the 9th day	⅛	Ice and ergot had been tried. Uterus uncontracted.
2050	22	1	April 19	Twins, turning	Recovered without a bad symptom	¼	Severe hæmorrhage.
2102	41	3	March 22	...	Recovered, though weak from hæmorrhage	¼	Ergot and cold ineffectual.
2421	22	2	July 22	...	Convalescent in a week	⅛	Ditto.
2446	39	8	July 28	...	Recovered quickly without bad symptoms	⅛	Ditto.
2516	22	2	July 28	...	Did not require visiting after first week	⅛	Ditto.
2108	21	2	April 4	Puerperal convulsions, turning	Death. See particulars among the cases recorded.		

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The following table gives the particulars of the five cases of placenta prævia, all terminated in the recovery of the mother:

No.	Age.	Confinement.	Sex.	Result to Child.	Treatment.	Result to Mother.
2255	25	7th	M	L	Separation of placenta. Ergot	Recovered.
2301	38	6th	M	D	...	Recovered.
2398	24	5th	M	D	Version	Recovered.
2532	19	2nd	M	D	Version	Recovered.
2601	37	10th	F	D	Forceps	Recovered.

Three cases of Puerperal convulsions occurred.

1726	21	1st	F	L	...	Death.
1937	36	9th	M	L	...	Recovered.
2108	21	2nd	F	D	...	Death.

For further particulars see reported cases.

Eleven maternal deaths occurred during the year, or ·74 per cent. This is a little higher than last year, which was ·71 per cent., but double the death-rate of the two preceding years, which were 32 for 1872, and 36 for 1871.

The following table gives an outline of the cases, which are more fully reported elsewhere:

No.	Age.	Confinement.	Sex.	Result to Child.	Cause of Death.	Date of Confinement.	Date of Death.
1726	21	1st	F	L	Puerperal convulsions	Feb. 14	Feb. 22
2108	21	2nd	F	D	Ditto	April 4	April 4
2287	33	11th	M M	L	Sudden death	June 12	June 12
2339	26	5th	F	D	Puerperal mania	April 18	April 24
2440	33	5th	...	...	Retroversion of gravid uterus	May 24	May 25
3027	34	6th	F	L	Phthisis	Oct. 31	Nov. 5
2722	22	2nd	M	L	Puerperal fever.	Nov. 3	Nov. 7
2776	37	12th	F	L	Ditto	Nov. 6	Nov. 12
3052	26	4th	M	L	Ditto	Nov. 6	Nov. 10
3058	25	3rd	F	L	Ditto	Nov. 6	
3101	29	1st	M	L	Ditto, ill three days	Nov. 7	Nov. 16

Nos. 2722, 2776, 3052, and 3058 were attended by the same gentleman.

From this table it may be seen that the five cases of puerperal fever occurred in the early part of November. The first case was No. 2722. The woman was confined on the 3rd of

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November. In the absence of the obstetric and assistant obstetric clerks, she was visited and examined at 1 p.m. by two students, who are said to have left the dissecting room to go to her. Four hours after this she was visited by the obstetric clerk, and delivered at 5.15 of a living male child twenty minutes after his arrival. The labour was a natural one. The gentleman who attended this case also attended about the same time twenty other cases. The dates on which he attended these are as follow:

2 cases on Oct. 29th.	1 case on Nov. 3rd.
4 „ Oct. 30th.	2 cases on Nov. 4th.
1 case on Oct. 31st.	1 case on Nov. 5th.
1 „ Nov. 1st.	5 cases on Nov. 6th.
2 cases on Nov. 2nd.	1 case on Nov. 7th.

It will be seen that the above-mentioned case he attended on the 3rd, and three of the five cases he attended on the 6th, were subsequently attacked by the disease. Now, as this gentleman numbered the maternity cards in the order in which he attended the cases, and it is found that the first two numbers of the five cases he attended on the 6th are the two which escaped, and it is further known that he visited on this date the case he attended on the 3rd, who by this time had symptoms of puerperal fever, we may reasonably suppose that the three who died were attended after, and the two who escaped before this visit. If this surmise is correct, it was not until after his visit on the 6th to the case of puerperal fever that he became a carrier of infection, for he attended between the 3rd and this visit five cases, none of whom suffered. This would show that he was not the primary bearer of infection, and leave little doubt as to the cause of the outbreak.

Case 3027, reported to have died of phthisis on Nov. 5th, was also attended by the same gentleman on the 31st of October. There is no record of her case further than the bare fact of her death and its cause. I have, however, made inquiries from the gentlemen who saw the woman, and they assure me she had no symptom of peritonitis, and that the disease was phthisis

Case 3101 was attended by another gentleman, who also attended subsequently, at least, twenty other cases, none of them were attacked by the disease. One is reported to have had slight local peritonitis, but she recovered.

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It is perhaps worth remarking that the fatal case this gentleman attended had no symptoms for seven days differing in this respect from the others. She, however, died in three days after their first appearance.

The outbreak was of a most severe type. All the cases attacked ended fatally on or before the fourth day after the commencement of symptoms; indeed, in two instances it was fatal on the fifth day after confinement.

Cases of post-partum hæmorrhage, in which solution of ferric perchloride was injected into the uterus.

1879.—M. S—, æt. 25, 3rd confinement. She was delivered of a living male child on March 9th. Hæmorrhage commenced on the removal of the placenta, which was torn. The resident accoucheur was sent for, who removed a small piece of placenta which had been left behind, and washed out the uterus with Oss of one sixth solution. The patient recovered without a bad symptom.

1886.—S. G—, æt. 27, 5th confinement. She was delivered of a living male child on March 23rd. Hæmorrhage came on about two hours after delivery. Resident accoucheur found she had fainted, and was much blanched. He therefore washed out uterus with Oss of one sixth solution. The woman did perfectly well.

1915.—C. D—, æt. 27, 4th confinement. She was delivered of a living male child on April 10th. Flooding commenced immediately on removal of the placenta. The resident accoucheur on his arrival found the bed saturated, and blood running over the floor. Cold, &c., had been tried. She then had ʒss of Ext. Ergot. Liq. administered, and the uterus cleared of clots, and controlled with the hands externally. ʒij more of ergot were also administered, as the uterus did not contract and the pulse was very small and weak. The resident accoucheur washed out the uterus with Oij of one fourth solution, which immediately controlled the hæmorrhage. The woman made a good recovery in a fortnight.

2041.—P. M—, æt. 40, 9th confinement. She was confined of a living male child on the 8th of March. Flooding commenced on the removal of the placenta. Ice and ergot had been tried before the arrival of the resident accoucheur, who cleared the uterus of clots, and washed it out with about Oj of one sixth solution. The patient got up on the ninth day.

2050.—M. A. C—, æt. 22, 1st confinement. This was a case of twins, in which version was performed. The woman, who was very weak from ill health, commenced to flood soon after delivery; and as she had taken some ergot previously, the resident accoucheur at once washed out the uterus with about Oss of one fourth solution. The hæmorrhage was immediately stopped. The patient recovered without a bad symptom.

2102.—S. T—, æt. 41, 3rd confinement. Delivered of a living female child on the 22nd of March. Up to the time of confinement she had been wearing a Hodge's

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pessary, and had had some hæmorrhage before labour. She was in very weak health. After labour profuse hæmorrhage came on. Ergot and cold had been used before the arrival of the resident accoucheur. He therefore at once injected Oss of one fourth solution into the uterus. The patient made a very good recovery, though very weak from the hæmorrhage.

2421.—L. F—, æt. 22, 2nd confinement. Delivered on the 22nd of July of a living male child. Hæmorrhage came on soon after the removal of the placenta. Cold and ergot had been tried before the resident accoucheur arrived. He then washed out the uterus with about Oss of one sixth solution. There was no further hæmorrhage. The patient was convalescent in a week.

2446.—E. C—, æt. 39, 8th confinement. Delivered on the 28th of July of a living male child. Profuse hæmorrhage came on soon after she had been left by the obstetric clerk. Cold and ergot were tried; but as the uterus again relaxed it was washed out with about Oj of one sixth solution. Patient recovered quickly without a bad symptom.

2516.—S. H—, æt. 22, 2nd confinement. Delivered on the 28th of July of a living male child. Hæmorrhage came on soon after the removal of the placenta: it was not controlled by cold or ergot. The uterus was therefore washed out with one sixth solution. The patient did not require visiting after the first visit.

2108.—R. S—, æt. 21, 2nd confinement expected in April. Her first confinement is said to have been a bad one, but in what way could not be ascertained. She had been feeling unwell on Saturday, the 1st day of April.

April 2nd.—In the middle of the night of Sunday she complained of sickness and vomiting. Her husband got some medicine from a chemist, which checked the vomiting.

3rd.—During Monday she complained of giddiness and of being unable to see, and went out thinking the air would recover her, but she was soon obliged to return. About 6 p.m., whilst retching, she suddenly fell back in a sort of fit. As she had had some pains like those of labour the card was sent up and the obstetric clerk attended; but finding the os not dilated, and the woman apparently sleeping with no pain, he left.

4th.—During the night she had another fit, and on the obstetric clerk going to see her about midday on Tuesday, and finding her unconscious, he sent for the resident accoucheur. On his arrival he found her unconscious, muttering, and throwing herself about the bed. Pupils dilated and insensible to light. Pulse scarcely perceptible. Os uteri soft, about the size of a crown, with head presenting. The resident accoucheur returned to the hospital for chloroform, &c. During his absence the woman had two convulsions, the eyes being rolled up and the limbs violently contracted. On his return she was quiet, with stertorous breathing. Pupils widely dilated. Pulse imperceptible at the wrist. It was agreed to turn the child, and deliver as soon as possible. This was accomplished with some difficulty, as the membranes had been ruptured some time. The child only survived a short time. The uterus had to be washed out with perchloride of iron, as it would not contract. After delivery she seemed to survive slightly. An enema of beef tea and brandy was administered, as she could not swallow.

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She was seen again at 4 p.m., and the enema was ordered to be repeated. At 8 p.m. she was sinking fast. All the urine had been passed involuntary, and none could be obtained for examination.

5th.—At 1 a.m. respirations were 32; pulse imperceptible at wrist. She died at 2 a.m., never having regained consciousness from the first seizure.

Cases of Puerperal Convulsions.

2108.—See among cases of post-partum hæmorrhage injected with solution of ferric perchloride.

1937.—A. W—, æt. 36, 9th confinement. Labour pains commenced about 6 p.m. The obstetric clerk was summoned at 12 p.m., but finding the os would scarcely admit the tip of his finger was about to leave when the woman was seized with a convulsion. On the arrival of the resident accoucheur, he found the os would only admit one finger and was very rigid. The convulsion occurred every five or ten minutes. She was therefore placed under chloroform, and No. 2 hydros tube was introduced within the cervix. In about two hours the os was sufficiently dilated to admit two fingers, and it was found a hand had come down. The head had previously presented, but the dilator slipped in and must have pushed the head on one side. Version was accomplished by means of the finger of one hand in the uterus and the other hand on the abdomen, and the left leg brought down. The labour was completed at 6 p.m., a living male child having been born. The woman was kept more or less under chloroform for six hours during the labour, as at every pain she became convulsed. She was very sick after the chloroform, but had no convulsions. The mother and child did well. At the fourth week the mother was convalescent.

1926.—L. M—, æt. 21, 1st confinement. Delivered on February the 14th of a living female child. The obstetric clerk saw her first at 7.30 p.m. The labour proceeded satisfactorily until 10.30, except that she complained of great pain in the head and was constantly sick. At this time the child's head was distending the perinæum. Suddenly the cries of the patient ceased, and she became convulsed. The resident accoucheur was sent for, and on his arrival immediately used the forceps and the child was soon born. The placenta came away readily, and there was no hæmorrhage. The convulsions, however, still continued, the paroxysms lasting five to ten minutes, and recurring every twenty minutes; in the intervals the patient remained unconscious, and her breathing was stertorous. Ice was applied to the head, six leeches to the temples, and chloral hydrate administered. After this the fits gradually diminished in frequency, the last one occurring at 10.40 a.m. on the following day.

16th.—The patient had recovered consciousness and complained of pain in the limbs and at the lower part of her abdomen.

19th.—Had a rigor, followed by distressing vomiting. Abdomen tympanitic and very painful, especially on the right side.

20th.—The abdomen greatly distended and exceedingly tender. Knees drawn up. Tongue brown in centre, with red and glazed edges.

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21st.—Sickness continues. Complains of very little pain on pressure of the abdomen. Perfectly conscious. Pulse 170, thready.

22nd.—Patient died at 3 a.m. Was conscious to the last.

One grain of opium was administered every four hours on the 18th, every two hours on the 19th, but discontinued on the 20th.

Cases of Maternal Deaths.

1726. ***Puerperal convulsion.***—See cases of puerperal convulsion.

2108. Ditto, ditto

2287. ***Sudden death.***—E. S—, æt. 33, 11th confinement. The assistant obstetric clerk was called at 11 p.m., 12th June. She was then walking about. She had felt unwell for two or three weeks, and had been in labour since 5 p.m. Os was found about the size of half a crown, and a head presenting. She continued to have pains every ten or fifteen minutes till 12.30, when the first child was born. About twenty minutes afterwards the second bag of membrane ruptured, and another head presented. This child was born in about two and a half hours. Soon after this she fainted. The assistant obstetric clerk being alarmed, and at some distance from the hospital, called in the nearest surgeon. She recovered from this faint. Brandy and ergot were then administered, as the placenta had not come away. In twenty minutes she again fainted, and died. The resident accoucheur arrived a few minutes afterwards, and removed the placenta. There had been no hæmorrhage. The children were males.

Autopsy nine hours after death.—Body very fat; the abdomen had evidently been greatly distended; all the internal organs had much fat about them, but seemed otherwise healthy. In the uterus, which had contracted, there were a few clots. In the left ovary there were two recent corpora lutea, and in the right an old one.

The heart and uterus were brought to the hospital, and were examined by Dr. Barnes.

2339. ***Puerperal mania.***—E. H—, æt. 26, 5th confinement. Was delivered on April 18th of a female child, which lived only eight hours. The labour was tedious, but otherwise normal. The woman progressed favorably until the 22nd of April, when she had an attack of bronchitis. On the morning of the 23rd she suddenly became violently delirious. She was seen by Dr. Gervis, and ordered to take immediately a mixture of bromide of potassium and hydrate of chloral, twenty grains of each. This was repeated at 6 p.m., the woman still being violent. Her breathing was laboured on account of mucus. A mustard plaster was applied to her chest and back, and beef tea, milk, and ice given constantly. At 12 p.m. she was perfectly quiet, but her breathing was still difficult, and numerous râles were heard all over the chest. At 1 a.m. she died.

2440. ***Retroversion of gravid uterus.***—J. J—, æt. 33, 5th confinement. Expected in August. Seen at 4 p.m. on the 24th May. About two weeks before this date, after a long walk with a heavy child in her arms, she experienced some difficulty in passing water; this difficulty increased, so that at last the water only dribbled away. When she was seen she was in great pain; her skin was hot and dry, and her tongue brown, with sordes on the lips, and everything about her was saturated with fetid urine. The fundus of the uterus could be felt just inside the vagina obstructing the rectum. The os uteri was reached with diffi-

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culty; it was situated high up above the symphysis pubis. The bladder was immensely distended; six pints of stinking urine, the colour of coffee, were drawn off; some bright blood accompanying the last portions. After this the patient was placed on her hands and knees, and the uterus replaced. The urine was ordered to be drawn off every four hours, and beef tea and wine to be administered. The patient died the following day at 12 a.m.

3027. *Phthisis.*—M. T—, æt. 34, 5th confinement. Delivered on the 31st October of a living female child. Died November 5th of phthisis.

There is no further record of this case.

2722. *Puerperal fever*—M. A. D—, æt. 22, 2nd confinement. Living male child. Natural labour. November, 3rd, 1874.

6th.—Obstetric clerk was sent for, and found the patient had had a rigor and was vomiting. Her skin was hot with tongue foul. Abdomen distended, and seat of much pain. Pulse 120; temp. 103°. Severe headache.

7th.—Seen by Dr. Gervis and resident accoucheur. Respirations shallow and hurried. Pulse 136; temp. 100·2°. Herpes on lips. Lochia and milk suppressed. Bowels constipated. She had been delirious the night preceding. Died at 9.30 p.m.

2776. *Puerperal fever.*—E. W—, æt. 37, 12th confinement. Living female child. Natural labour. November 6th, 1874. Died November 12th.

3052. *Puerperal fever.*—A. B—, æt. 26, 4th confinement. Living male child. Natural labour. November 6th, 1874.

9th.—The patient was found to have swelling with pain in the region of the uterus. The skin was hot. Pulse 130. Suppression of lochia and milk; tongue foul.

10th.—Seen by resident accoucheur. Anxious expression. Dark ring round eyes. Breathing, very quick (36) and shallow. Temp. 101°; pulse 140. Abdomen distended. Tongue streaked with whitish fur. Bowels open. Able to move her legs. Complains of pain over whole abdomen, but expresses herself as better for treatment, viz. fomentations and Pil. Opii gr. j every three hours; this also relieved the incessant vomiting from which she suffered.

11.30.—Death preceded by delirium.

3101. *Puerperal fever.*—E. G—, æt. 29, 1st confinement. Living male child. Labour natural. Died 16th November, 1874. Ill three days.

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MEDICAL REPORT.

1874.

By W. S. GREENFIELD, M.D., B.S. Lond.

Table I.—General Statement.

	Males.		Females.		Total
Number of patients in medical wards on Jan. 1st, 1874	48	...	69	...	117
„ „ Dec. 31st, 1874	61	...	70	...	131

Number of patients discharged or died during the year 1874:

	Males.		Females.		Total.
Cured	266	...	331	...	597
Relieved	124	...	178	...	302
Unrelieved, or other causes .	55	...	59	...	114
Died	121	...	52	...	173
Transferred to surgical wards .	4	...	7	...	11
	570		627		1197

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TABLE II.—*General Table of Diseases.*

DISEASE.	NUMBER OF CASES.			AGE.			CURED.		RELIEVED.		UNRELVD. OR OTHER CAUSES.		DIED.		Mortality per cent.	Average number of days in hospital.	REMARKS, COMPLICATIONS, &c.
	Total.	M.	F.	Average.	Youngest.	Eldest.	M.	F.	M.	F.	M.	F.	M.	F.			
GENERAL DISEASES AND FEVERS.																	
Rötheln	1	1	...	...	...	21	1	...	...	...	...	...	...	...	...	25	
Measles	4	3	1	3½	2	4	2	1	...	...	...	...	1	...	25	23	1 broncho-pneumonia, fatal; 1 necrosis of tibia.
Varicella	2	2	...	2½	2	3	2	...	...	...	...	...	...	...	...	2½	
Scarlet fever	20	7	13	14	3½	27	6	9	...	1	...	...	1	3	25	29	
Do., sequelæ of	7	1	6	...	18	40	...	6	...	...	...	...	1	...	14.2	58	1 arthritis, 1 anæmia, 2 debility; 1 empyæma; 1 (female) general dropsy without albuminuria.
Typhus	12	7	5	21¾	2½	52	5	5	...	...	...	...	2	...	16.6	50	
Enteric	39	18	21	19.6	4	44	14	15	...	1	...	...	4	5	23	37	
Febricula	5	2	3	21	12	31	2	3	...	...	...	...	...	...	...	16	
Intermittent	2	2	...	28.5	26	31	2	...	...	...	...	...	...	...	...	14	
Diphtheria	5	1	4	18	3	30	1	3	...	...	...	...	...	1	20	15	
Erysipelas	37	19	18	34.6	12	58	15	16	...	1	...	1	4	...	11	25	2 of leg: the rest facial.
Pyæmia	6	6	...	13	2½	25	1	...	...	...	...	...	5	...	83	13	
Influenza	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Rheumatic Fever—																	
Acute	110	57	53	...	...	...	51	51	3	1	1	...	2	1	2.75	...	Average stay in hospital, males 37, females 39 days. For ages see special report.
Subacute	56	29	27	...	...	...	27	23	2	4	...	...	...	...	...	...	
Chronic rheumatism	4	2	2	...	...	...	...	...	2	2	...	...	...	...	...	...	
Gonorrhœal	1	1	...	...	...	37	1	...	...	...	...	...	...	...	...	15	
Rheumatoid arthritis	1	...	1	...	...	45	...	...	...	1	...	...	...	...	...	65	
Gout	7	6	1	46½	37	57	4	1	2	...	...	...	...	...	...	48	

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Rickets	1	1	...	...	...	11	...	...	1	...	...	...	...	...	17	
Diabetes	6	4	2	42	29	56	...	...	1	2	3	...	...	...	38	
Anæmia and chlorosis	8	...	8	24½	17	51	...	5	...	3	...	...	...	...	35	
Addison's disease	3	3	...	31	24	45	...	...	...	...	...	...	...	3	100	7	
Exophthalmic goitre	1	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	
Syphilis	6	3	3	34.6	26	44	2	1	1	2	...	...	...	...	...	40	
Whooping-cough	1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	
Nervous System.																	
Acute meningitis	1	1	...	7 m.	...	...	...	...	...	...	...	...	1	...	...	...	
Tubercular „	5	3	2	...	...	...	...	...	...	...	...	...	3	2	100	...	1 following phthisis; 2 following pleurisy; 2 in infants.
Chronic hydrocephalus	2	2	...	10½ m.	5 m.	16 m	...	...	1	...	...	...	1	...	50	28	1 had also spina bifida; fatal from bronchitis.
Tumour of brain	3	2	1	31	19	84	...	...	...	...	1	1	1	...	33	82	The fatal case, one of spindle-celled sarcoma growing from dura mater at base of skull.
Abscess	3	1	2	13	10	19	...	...	...	1	...	...	1	1	66	28	
Cerebral hæmorrhage	6	5	1	52	30	62	...	...	...	...	...	...	5	1	100	2	Non-fatal cases under 'Hemiplegia'; 1 case associated with fracture of skull. Only 1 case lived over more than 1 day.
Hemiplegia, right	18	9	9	M. 52½ F. 40½	36 13	76 55	1	1	6	4	2	1	...	3	16.5	M. 51 F. 44	
„ left	7	5	2	M. 38 F. 44½	12 41	65 48	1	...	2	2	1	...	1	...	14.3	M. 32 F. 34	
Obscure cerebral disease	7	4	3	35	26	45	...	...	2	1	1	2	1	...	14.3	17	The fatal case one of congestive apoplexy; probably in chronic alcoholism.
Mental disease—																	
Acute Mania	3		1	27	21	32	...	1	...	...	1	...	1	...	33	4	
Chronic „	2	2	...	37½	30	47	...	...	...	...	2	...	...	...	...	17	
General paralysis	2	2	...	59½	54	65	...	...	...	...	2	...	...	...	...	16	
Imbecility	2	...	2	35½	9	62	...	...	...	2	...	...	...	...	...	22	

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TABLE II—*continued.*

DISEASE.	NUMBER OF CASES.			AGE.			CURED.		RELIEVED.		UNRELVD. OR OTHER CAUSES.		DIED.		Mortality per cent.	Average number of days in hospital.	REMARKS, COMPLICATIONS, &c.
	Total.	M.	F.	Average.	Youngest.	Eldest.	M.	F.	M.	F.	M.	F.	M.	F.			
Melancholia	1	1	...	...	56	...	...	...	...	...	1	...	...	...	...	16	
Epileptic mania	1	...	1	...	15	...	...	...	...	...	...	1	...	...	...	36	
Spinal Cord—																	
Paraplegia	13	9	4	33½	4	57	1	2	5	1	3	1	...	...	...	53	
Locomotor ataxy	4	4	...	34	22	50	...	...	1	...	2	...	1	...	25	56	
Infantile paralysis	2	1	1	...	7	8	...	...	...	...	1	1	...	...	...	50	
Progressive muscular atrophy	1	...	1	40	...	...	...	...	...	...	...	1	...	...	...	42	
Functional Disease—																	
Epilepsy	22	18	4	27¾	8	78	12	1	3	3	2	...	1	...	4·5	18½	Only 2 cases more than 15 years of age.
Convulsions	1	...	1	...	8 m.	...	...	1	...	...	...	...	...	...	...	2	
Chorea	25	3	22	13½	4	44	2	19	1	2	...	1	...	...	...	54	
Paralysis agitans	2	2	...	54	54	54	...	...	...	...	2	...	...	...	...	80	One patient in twice, with interval of 6 months.
Hysteria	11	...	11	21	10	38	...	9	...	1	...	1	...	...	...	35½	
Tetanus	2	2	...	...	33	40	2	...	...	...	...	...	...	...	...	18	
Clonic torticollis	2	2	...	...	44	50	...	...	...	...	2	...	...	...	...	110	
Nerve paralysis—																	
Facial	1	1	...	30	...	...	1	...	...	...	...	...	...	...	...	42	On left side, of 2 months' duration.
Various paralyses—	2	2	...	...	...	...	...	...	1	...	1	...	...	...	...	...	1 of pudic and small sciatic nerves, 1 of fifth cranial, sensory and motor.

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Neuralgia .	4	1	3	...	...	...	1	2	...	1	...	...	...	...	...	15	1 pleurodynia, 1 of head, 1 of abdomen with pulsating aorta, 1 of neck and face.
Sciatica .	4	3	1	52	23	68	...	...	2	1	1	...	...	...	...	34	
Miscellaneous	2	1	1	...	...	...	...	...	1	...	...	1	...	...	...	...	
CIRCULATORY SYSTEM.																	
Pericardium—																	
Pericarditis .	1	1	...	15	...	...	...	...	...	...	...	...	1	...	...	9	No post-mortem; no history of rheumatism.
Peri- and endocarditis .	1	1	...	14	...	...	...	...	1	...	...	...	...	...	...	66	Without history of rheumatism.
Heart, muscular tissue—																	
Calcification .	1	1	...	44	...	...	...	...	...	...	...	...	1	...	...	10	
Fibroid degeneration .	1	1	...	43	...	...	...	...	...	...	...	...	1	...	...	2	
Dilatation .	...	1	...	33	...	...	...	...	1	...	...	...	...	...	...	25	
Congenital cyanosis	2	2	...	...	10	7	...	...	2	...	...	...	...	...	...	185	
Valvular disease—																	
Aortic .	16	11	5	M. 41 F. 32	29 16	57 52	... ...	... ...	6	4	3	...	2	1	13·7	47 22	
Mitral .	42	23	19	M. 32½ F. 28¼	9 12	63 55	...	...	15	14	1	3	7	2	21·5	M. 35 F 35·7	
Mitral and aortic together .	8	4	4	M. 46 F. 27	42 20	51 30	...	...	2	2	...	...	2	2	M. 50 F. 50	29 46	
Aneurism .	10	9	1	M. 42½ F. 39	32 ...	68 ...	...	...	3	1	...	...	6	...	M 66·6 F. ...	189 65	1 case in Hosp. 940 days.
RESPIRATORY SYSTEM.																	
Larynx—																	
Laryngitis, acute .	1	1	...	44	...	...	1	...	...	...	...	...	...	...	...	35	
Laryngeal catarrh	2	1	1	...	2	7	1	1	...	...	...	...	...	...	...	19	
Hæmoptysis .	6	4	2	44	26	58	...	1	3	...	...	1	1	...	16·6	28	
Phthisis .	68	31	37	M 37·5 F. 30	7 3	62 71	...	...	16	22	2	6	13	9	...	38	See special abstracts.
Bronchitis, capillary.	6	3	3	4½	2	8	1	3	...	...	...	...	1	...	33	22	
„ acute .	8	5	3	19	14	28	5	3	...	...	...	...	...	...	...		

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TABLE II—*continued.*

DISEASE.	NUMBER OF CASES.			AGE.			CURED.		RELIEVED.		UNRELVD. OR OTHER CAUSES.		DIED.		Mortality per cent.	Average number of days in hospital.	REMARKS, COMPDICATIONS, &c.
	Total.	M.	F.	Average.	Youngest.	Eldest.	M.	F.	M.	F.	M.	F.	M.	F.			
RESPIRATORY SYSTEM (*continued*).																	
Bronchitis, chronic	36	17	19	47·3	25	75	6	9	8	8	1	...	2	2	11	33	Most of these were cases of chronic bronchitis, with emphysema, admitted in acute attack.
Broncho-pneumonia	3	1	2	18	6	31	1	2	...	...	...	...	...	...	...	39	
Acute pneumonia—																	
Right	31	20	11	26·4	5	70	14	10	1	...	...	...	5	1	20	26	
Left	14	9	5	22·45	5	58	8	4	1	...	...	...	...	1	7	36	See special abstracts.
Double	15	12	3	29·6	5	60	6	3	...	...	...	...	6	...	40	26	1 erysipelas whilst in Hosp.
Pleurisy	15	9	6	32	12	58	5	5	2	1	...	...	2	...	13	46	
Empyema	8	5	3	21	3	42	...	...	...	1	1	...	4	2	75	133	
Intra-thoracic tumour	2	2	...	...	35	38	...	...	1	...	...	...	1	...	50	19	No post-mortem on fatal case.
DIGESTIVE SYSTEM.																	
Tonsillitis	16	5	11	26	16	45	4	11	1	...	...	...	...	...	...	19	
Catarrh of fauces	3	2	1	19	15	24	2	1	...	...	...	...	...	...	...	5	
Stricture of œsophagus	3	2	1	50	40	63	...	...	1	1	...	...	1	..	33	40	1 cancer, 2 spasmodic.
Stomach—																	
Dyspepsia	17	6	11	36	17	54	5	8	1	3	...	...	...	...	...	25	1 erysipelas in hospital.
Gastrodynia	1	...	1	40	...	...	...	1	...	..	...	...	...	...	...	...	
Ulcer and hæmatemesis	8	5	3	42	22	60	4	2	1	1	...	...	...	...	...	21	
Cancer	9	5	4	49	33	68	...	...	2	...	1	2	2	2	44	37	

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Intestines—																	
Ulceration	1	1	...	66	...	...	...	...	...	...	...	...	1	...	100	11	Ulcer of duodenum, perforation, peritonitis.
Diarrhœa	6	2	4	22½	2	49	2	4	...	...	...	...	...	...	...	20	
Dysentery	4	3	1	36	31	48	...	1	2	...	...	...	1	...	25	68	1 with abscess of liver; the 3 males cases of tropical dysentery.
Colic	4	2	2	18	2½	36	2	2	...	...	...	...	...	...	...	6	
Constipation	5	...	5	30	19	49	...	4	...	1	...	...	...	...	...	6	
Intestinal obstruction	1	...	1	53	...	...	...	1	...	...	...	...	...	...	...	17	
Follicular enteritis	1	1	...	2½	...	...	...	...	...	...	...	...	1	...	...	2	Vomiting and convulsions.
Perityphlitis	4	4	...	31	17	51	4	...	...	...	...	...	...	...	...	...	
Strangulated hernia	1	...	1	66	...	...	...	...	...	...	...	...	...	1	100	5	Operation.
Rectum—																	
Cancer	1	1	...	59	...	...	...	...	...	...	1	...	...	...	...	56	
Internal hæmorrhoids	1	...	1	29	...	...	...	...	...	...	...	1	...	...	...	6	Discharged as unsuitable.
Stricture, of	1	...	1	32	...	...	...	...	...	...	...	...	...	...	...	...	Transferred to surgical wards.
Peritoneum—																	
Peritonitis	3	2	1	23	9	31	...	1	...	...	...	...	1	...	33	30	1 chronic, fatal.
Ascites	1	1	...	56	...	...	...	...	...	...	...	...	1	...	100	6	Probably chronic peritonitis.
Liver—																	
Cirrhotic	13	10	3	52½	40	60	...	...	3	...	1	2	6	1	58	28	
Hydatid	6	2	4	...	...	...	...	...	2	2	...	...	...	2	...	...	
Syphilitic	1	1	...	39	...	...	...	...	1	...	...	...	...	...	...	25	
Enlarged	4	4	...	40	28	50	...	...	1	...	3	...	...	...	...	41	1 probably malignant, 1 waxy.
Cancer	2	...	2	...	43	56	...	...	...	1	...	1	...	...	...	55	
Icterus	7	4	3	30	20	39	3	3	...	...	...	...	...	...	...	22	
Catarrhal—																	
From gallstone	4	...	4	31	24	39	...	2	...	1	...	1	...	...	...	32	
Of doubtful origin	2	...	2	...	36	57	...	...	...	1	...	1	...	...	...	12	
Abdominal tumours, &c.																	
Tabes mesenterica	1	1	...	1½	...	...	...	...	...	...	...	...	1	...	100	46	
Nature doubtful	3	1	2	...	27	71	...	...	...	1	...	2	...	...	...	20	

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TABLE II—*continued.*

DISEASE.	NUMBER OF CASES.			AGE.			CURED.		RELIEVED.		UNRELVD. OR OTHER CAUSES.		DIED.		Mortality per cent.	Average number of days in hospital.	REMARKS, COMPLICATIONS, &c.
	Total.	M.	F.	Average.	Youngest.	Oldest.	M.	F.	M.	F.	M.	F.	M.	F.			
DIGESTIVE SYSTEM (*continued*).																	
Enlarged spleen	1	...	1	62	...	...	...	...	...	...	...	...	...	1	...	...	No post-mortem.
Abcess in abdominal wall	1	...	1	54	...	...	...	1	...	...	...	...	...	...	...	34	
Injury to abdomen	2	2	...	...	11	23	1	...	1	...	...	...	...	...	...	17	
SKIN.																	
Purpura	2	1	1	...	13	15	1	1	...	...	...	...	...	...	...	26	
Eczema	2	...	2	...	28	40	...	2	...	...	...	...	...	...	...	20	
Eczema rubra	1	...	1	40	...	...	...	1	...	...	...	...	...	...	...	45	
Psoriasis	3	...	3	12	5	21	...	...	...	2	...	1	...	...	...	47	
Erythema nodosum	3	...	3	20	20	20	...	3	...	...	...	...	...	...	...	14	
Lichen	2	...	2	...	22	48	...	1	...	...	...	1	...	...	...	6	
Prurigo	1	1	...	74	...	...	1	...	...	...	...	...	...	...	...	30	
Favus	1	...	1	3	...	...	...	1	...	...	...	...	...	...	...	505	
Pemphigus	1	...	1	6½	...	...	...	1	...	...	...	...	...	...	...	59	
Ulcer	1	...	1	26	...	...	...	1	...	...	...	...	...	...	...	11	
Pustular eruption	1	1	...	24	...	...	1	...	...	...	...	...	...	...	...	13	
Anasarca simplex	2	...	2	...	50	64	...	...	...	1	...	1	...	...	...	62	
MUSCULAR SYSTEM.																	
Muscular rheumatism	16	8	8	42	8	71	6	4	1	3	1	1	...	...	...	22	
Lumbago	2	1	1	...	25	26	1	...	...	1	...	...	...	...	...	12	

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POISONS.																	
Alcohol—																	
Intoxication	1	...	1	28	...	...	...	1	...	...	...	...	...	...	...	1	
Chronic alcoholism	1	...	1	45	...	...	...	...	...	...	...	...	...	1	...	43	
Delirium Tremens	10	9	1	32	20	53	7	1	...	...	1	...	1	...	...	21	
Lead—																	
Colic	5	4	1	28	21	34	3	1	1	...	...	...	...	...	...	11	3 males had albuminuria.
Paralysis	2	1	1	...	45	48	1	...	...	1	...	...	...	...	...	44	Male, gout also.
Opium	1	...	1	25	...	...	...	1	...	...	...	...	...	...	...	6	Accidental overdose of laudanum.
Morphia	1	1	...	22	...	...	1	...	...	...	...	...	...	...	...	2	
White precipitate	1	...	1	28	...	...	...	1	...	...	...	...	...	...	...	3	
Corrosive sublimate	1	...	1	35	...	...	...	...	...	...	...	...	...	1	...	4	Poison given by chemist in mistake for bismuth.
BONES AND JOINTS.																	
Caries of vertebræ	9	7	2	25	6	40	...	...	2	1	3	1	2	...	...	...	1 lumbar abscess, 1 transferred, 2 cervical vertebræ, 2 males and 2 females psoas abscess, 1 empyema.
„ os calcis	1	1	...	28	...	...	...	...	...	...	1	...	...	...	...	...	Transferred.
Synovitis	4	...	4	29	24	33	...	2	...	...	...	2	...	...	...	...	2 transferred. 1 of wrist, and 1 of knee, following rheumatism.
Periostitis	3	1	2	34	14	54	...	...	1	2	...	...	...	..	...	...	
EXTERNAL TUMOURS	4	4	...	...	...	...	1	...	1	...	2	...	...	...	...	...	1 transferred.
Miscellaneous—																	
SURGICAL	4	1	3	...	...	...	1	2	...	...	...	1	...	...	...	...	1 female transferred.
VASCULAR SYSTEM.																	
Epistaxis	2	1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1 male transferred.
Hæmorrhoids	2	2	...	...	...	...	2	...	...	...	...	...	...	...	...	...	
Thrombosis of femoral vein	2	2	...	...	48	53	2	...	...	...	...	...	...	...	...	31	In both apparently spontaneous, in unhealthy subjects.
Miscellaneous—																	
Immersion	4	3	1	...	...	...	3	1	...	...	...	...	...	...	...	...	In 1 male, slight pneumonia followed; 3 were cases of attempted suicide, 1 of accident.

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TABLE II.—*continued.*

DISEASE.	NUMBER OF CASES.			AGE.			CURED.		RELIEVED.		UNRELVD. OR OTHER CAUSES.		DIED.		Mortality per cent.	Average number of days in hospital.	REMARKS, COMPLICATIONS, &c.
	Total.	M.	F.	Average.	Youngest.	Eldest.	M.	F.	M.	F.	M.	F.	M.	F.			
Miscellaneous—(contd.)																	
Tænia . . .	1	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	
Debility, &c. . .	9	5	4	...	...	...	1	1	3	2	1	1	...	...	...	...	
Brought in dead .	5	5	1	...	...	...	...	...	...	...	...	...	...	...	...	...	No post-mortem on these cases.
No notes . . .	6	4	2	...	...	...	...	...	...	...	3	2	1	...	...	...	

DISEASE.	No. of cases.	Married.	Single.	AGE.			Cured.	Relieved.	Unrelieved.	Died.	REMARKS.
				Average.	Eldest.	Youngest.					
FEMALE GENERATIVE ORGANS.											
Amenorrhœa	3	1	2	28¾	54	16 (2)	...	3	...	...	
Dysmenorrhœa . . .	5	5	...	38½	48	13	...	5	...	...	
Menorrhagia	9	5	4	28⅓	45	16	2	4	3	...	
Uterus—											
Body and fundus—											
Anteflexion and-version .	3	3	...	28	...	...	2	1	...	...	
Retroflexion and-version .	9	5	4	32½	60	21	1	8	...	...	
Congestion and inflammation .	4	3	1	34½	42	28	3	1	...	...	

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Prolapse	7	6	1	42	58	21	2	4	1	...	
Cervix—											
Hypertrophy	15	12	3	34	48	19	11	4	...	...	
Polypus and fibroid	11	7	4	39	58	20	7	2	2	...	8 operation.
Peritoneum—											
Perimetritis and pelvic cellulitis	11	10	1	27	39	18	5	5	1	...	1 transferred.
Pelvic hæmatocele	5	2	3	23½	36	18	4	1	...	...	2 suppurated.
Ovaries—											
Ovarian tumour	7	2	5	...	....	...	...	2	3	2	2 transferred, 1 acute peritonitis, 1 fatal from cancer of liver, 1 tapped.
CANCER of uterus	6	6	...	45	64	33	...	2	3	1	
„ cervix only	15	11	4	37	59	27	...	10	3	2	
Vagina and Perineum—											
Ruptured perineum	3	3	...	39	45	34	1	2	...	...	Operations in 2 cases, 3 times on one.
Vulva—											
Folliculitis of	1	1	...	40	...	...	...	1	...	...	
Rodent ulcer	1	1	...	39	...	...	...	1	...	...	Operation.
Hypertrophy of labium	1	1	...	33	...	...	1	...	...	...	Operation.
Cyst in labium	1	1	...	48	...	...	...	1	...	...	Cyst opened.
„ vagina	1	1	...	22	...	...	...	1	...	...	Cyst opened.
Urethra—											
Vascular tumour	1	1	...	58	...	...	...	...	...	1	
Papilloma	1	1	...	37	...	...	...	1	...	...	Operation.
DISORDERS AND SEQUELÆ OF PREGNANCY	1	...	1	18	...	...	...	1	...	...	
Abortion	1	1	...	33	...	...	1	...	...	...	
Extra-uterine fœtation	1	1	...	26	...	...	...	...	...	1	
Phlegmasia dolens	3	3	...	31	39	25	2	1	...	...	1 erysipelas in hospital.
Other sequelæ	3	...	...	36	47	24	3	...	...	...	
Coccydynia	1	...	1	44	...	...	...	1	...	...	

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SPECIAL ANALYSES AND ABSTRACTS.

I.—MEASLES.

The only case worthy of note was that of a child 2 years old, fatal from broncho-pneumonia, on the 5th day from the appearance of the rash. The onset of the disease was marked by vomiting, rigors, with sneezing and lachrymation, 8 days before admission, but no eruption was seen until the day of admission. The other case presented no special features of interest.

One case occurred in the hospital: that of a child 4 years old, on whom excision of the ankle-joint was performed for necrosis. The measles rash was observed on the 11th day from admission, and she was transferred to the medical wards. It is obvious, however, that the infection had occurred before admission to the hospital.

SCARLET FEVER.

The number of cases showed a considerable increase on those of the previous year, 22 having been discharged as against 10 in 1873.

The date of onset was exactly ascertained in 14 cases. In 2 cases it was on the day before admission; in 7 cases, 2 days; in 2, 3 days; in 1, 5 days; in 1, 8 days; and in 1, 15 days. Three of the cases were in the hospital too short a time for any notes to be taken.

Albuminuria was noted in only 3 cases during the acute attack; in 1 case it was severe and continuous; in 2 only slight and transient, occurring in the second week. In 1 other case albumen appeared in the urine on the 20th day, and lasted for nearly 3 weeks.

Four cases, 1 male and 3 females, were fatal. Of the females, 2 were children, aged 6 and 9 respectively, admitted moribund, who died before any notes could be taken; and no post-mortem was obtainable in one of the cases.

The other fatal cases were as follow:

Case 1.—C. E—, æt. 20, a draper's assistant. Had been ill a fortnight before admission, the onset having occurred with vomiting, backache, and sore throat. On admission, Feb. 28th, there were ulcerated sore throat and diffuse swelling of the glands of the neck. Four days after admission he complained of pain in the joints, which was followed by some swelling; and on March 6th severe pericarditis set in, and pneumonia later. These, however, improved, and he appeared to be doing well, when on April 4th he became worse, with great prostration and

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dyspnœa, and rapidly sank. *Post-mortem.*—Left pleura contained 12 oz. fluid; both lungs partially collapsed, much congested. Pericardium completely adherent and much thickened; heart with pericardium weighed 24 oz. All the cavities much dilated; the muscular tissue degenerated; recent vegetations on mitral valve. Kidneys enlarged, with some congestion, and cloudy swelling of epithelium of convoluted tubules. (No albuminuria had occurred throughout the whole attack.)

Case 2.—M. F—, female, æt. 19. Had been under treatment in the surgical wards for hip-joint disease. She was noticed to be ailing from Oct. 17th; on the 19th was seized with severe vomiting, diarrhœa, and sore throat, with temperature of 103·4° F., and was removed to the fever wards. The swelling of the tonsils was such as to produce considerable difficulty of breathing, and they were incised. On Oct. 23rd (the 5th day) she died somewhat suddenly, apparently from asthenia. The *post-mortem* was remarkable chiefly for the enormous size of the liver, spleen, and kidneys, and their peculiar condition, which may perhaps be partly ascribed to the combination of chronic and acute disease. The *liver* weighed 142 oz., measured 13 inches vertically by 12½ inches across, was smooth, yellowish, pale, extremely soft, for the most part fatty looking, with some translucent portions, and was slightly stained by iodine. The *spleen* was very large, weighing 24 ozs., quite soft, unstained by iodine; the pulp readily washed away. The *kidneys* weighed together 27½ oz., the substance very soft, almost diffluent, surface smooth, capsule entirely detached. The enlargement was chiefly due to the swelling of the cortical substance, which was white or slightly yellowish in colour, and scarcely coherent. There were some ecchymoses on the surface, and numerous ecchymoses in the pyramidal portions.

Case 3.—Sarah J. C—, æt. 9. Admitted Nov. 18th; died Nov. 19th, at 3.15 a.m. *Post-mortem.*—Lungs partially collapsed; bronchi inflamed. Kidneys enlarged, surface smooth, slightly injected, cortex hyperæmic and swollen.

SEQUELÆ OF SCARLET FEVER. M. 1, F. 6.

One of these was suffering from debility only, another from very slight anasarca and debility. One was a case of general dropsy without albumen, none being found in the urine during her stay in the hospital. Two were cases of albuminuria with dropsy: in 1 case only slight; in the other, which was severe, the dropsy commenced on about the 7th day from the first attack, and the albuminuria lasted for 8 weeks from the date of admission on the 10th day. This patient, whose age was 22, was said to have had an attack of scarlet fever followed by dropsy some years previously. In 1 case, a female, æt. 39, who was admitted at about the end of the third week from the onset, and whose skin was freely desquamating, had some effusion into the left knee- and right elbow-joints when admitted. The elbow recovered in about 3 weeks, but the knee-joint became worse, and symptoms of arthritis supervened, and finally she was transferred to the surgical wards eleven weeks after admission.

Only 1 case was fatal, that of a boy æt. 6, who was admitted on Dec. 24th and died on the same day, nine weeks from the date of attack, having suffered from anasarca. *Post-mortem.*—The right pleura was found to be full of pus, the lung collapsed and bound down by layers of adhesion.

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TYPHUS.

Of the 7 male cases the ages were as follow: 13 years, 2 cases; 14, 19, 45, and 52; of the females, 8, 16, 23, 27 and 29 years respectively. The only two fatal cases were the two males, æt. 45 and 52. In cases where a sudden and marked onset was noted the patients were admitted on the following days of the disease: 3rd, 1; 4th, 1; 5th, 3; 6th, 2. One case, a child, æt. 8, had been ill about a fortnight; another, æt. 28, the mother of the preceding, for about the same time; in 1 case the disease occurred during childbed, and the exact date was not observed. In another case, a boy, æt. 13, the patient had been seized with vomiting and diarrhœa 10 days before admission, and took to bed for one day, but then got up, and was compelled to keep his bed again till 3 days before admission; when admitted there was a well-marked rash. In 1 of the fatal cases the patient had an epileptiform seizure 4 days before admission, and this appeared to have marked the onset of the attack; when admitted he was in a state of rambling delirium, with an elevated temperature; a petechial rash appeared before death, which occurred on about the 8th day of the disease. The other fatal case was that of a male, æt. 52, a clerk, who was said to have been quite well until a week before admission; the onset of the disease was marked by malaise, loss of appetite and sleep, and slight occasional shivering 6 days before admission. A prolonged rigor occurred on the day before admission. When admitted on the 7th day the rash was already well marked, and there was great prostration and wandering delirium. Tremor, at first slight, rapidly increased, becoming almost clonic spasm, and the delirium was severe; the patient died suddenly on the 4th day from admission or about the 10th day of the disease. *Post-mortem.*—The heart was found to be in an advanced stage of fatty degeneration, the lungs collapsed at the posterior parts, and much congested, the spleen large and soft, and the pia mater much congested.

In the non-fatal cases the principal complications were bronchitis and pneumonia; in one case severe diarrhœa occurred; and in another case, a boy, æt. 13, periostitis over the tibia occurred as a sequela.

DIPHTHERIA.

Five cases, 1 male and 4 females. Only 1 case fatal—a child, æt. 3. Three of the cases occurred in the hospital; 2 of the patients being nurses, and 1 a lady probationer. In neither of these was the disease at all well marked or severe, all being discharged as convalescent in less than 12 days. One of the patients, a nurse in Victoria (children's) ward, had been nursing a fatal case of diphtheria which was under the care of one of the surgeons. The fourth non-fatal case was that of a child, æt. 3½, who was under treatment as an out-patient for lichen, and the attack was a severe one.

The fatal case, a child, æt. 3, was admitted on May 10th, having had what was supposed to be a severe cold for three days before; she was seized on the day before admission with sore throat and severe croupy cough; the respiration rapidly became embarrassed, and when admitted she was livid and apparently moribund. Tracheotomy was immediately performed with great relief, and the

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patient slept well and took food, but on the following day the respiration again became embarrassed, and death occurred about 30 hours after the operation. *Post-mortem.*—Exudation was found in the upper part of the pharynx and the posterior nares, and the whole larynx and trachea were completely plugged by a quantity of exudation, forming a solid cast of the tube. The larger bronchi were also filled by exudation, and the lungs partially collapsed.

ENTERIC FEVER.

The cases of enteric fever, although less numerous than in the preceding year, showed a very much higher death-rate, both actual and relative. Thus, although only 39 cases were treated as against 48 in 1872, the number of deaths was 9 instead of 2, and the mortality nearly 23 per cent. instead of a little over 4 per cent. This is especially remarkable, as during the previous year there was an epidemic of some severity, and also because the treatment, both medicinal and dietetic, was the same as in the previous year. It is probable that the difference may be accounted for in part by the fact that the onset of the disease during the epidemic of 1872 was often sudden and well-marked, and that patients were sent to the hospital at a much earlier stage of the disease than is usual, and therefore were placed in a more favourable position for recovery. Moreover, although the constitutional symptoms were well-marked and severe in many of the cases at the onset, there was a remarkable number in which diarrhœa was very slight or absent, and in which the general symptoms were much more severe than the local.

ERYSIPELAS.

37 cases—M. 19, F. 18. Two cases of leg, the rest of face. Of these, only 4 fatal. All males.

Fatal Cases.—Case 1.—G. D., m., æt. 50, a cabman. Had an attack of facial erysipelas a fortnight before admission, which lasted about 10 days: then a relapse occurred, in which he was admitted. After 6 days in the hospital the eruption was desquamating, and the temperature had fallen to normal; but three weeks later a relapse again occurred, with some pneumonic consolidation at the base of the right lung. This resolved only incompletely, and the patient gradually sank 3 weeks after the relapse, and about 9 weeks after admission. *Post-mortem.*—Chronic bronchitis and emphysema; granular contracted kidneys, &c.

Case 2.—M., æt. 52. Admitted 12 days after onset of erysipelas of the face, which was recovering on admission. Pleuro-pneumonia came on 2 days later, and the patient died on the 6th day from admission. *Post-mortem.*—Granular contracted kidneys, hypertrophy of heart, and acute pleuro-pneumonia discovered.

Case 3.—M., æt. 43, a labourer. Admitted on the 4th day from onset, with erysipelas of the face and neck, which spread down the back and into the axilla. Some albuminuria was noted from the onset, and the temperature was high and very irregular, varying from 99·3° to 104·4°. Death occurred on the 22nd day. *Post-mortem.*—Acute nephritis; lungs deeply congested and œdematous; spleen and liver acutely swollen.

Case 4.—M., æt. 23, a platelayer. The date of onset was doubtful, the patient

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being admitted moribund, and dying 2½ days after admission. *Post-mortem.*—General broncho-pneumonia.

PYÆMIA.

The 6 cases of pyæmia occurring in patients under medical care were all males, and each presented features of considerable interest. Five of these were fatal, one being cured, but discharged for misconduct. In 2 cases the disease was due to slight external wounds, one on the eye, another on the foot; in two was associated with disease of the internal ear; in one with necrosis of the femur, and in one, a case of considerable difficulty and obscurity, it appeared to originate from a mediastinal abscess, due to a fall from a horse.

The following abstracts of the cases only give a bare outline of the chief facts:

Case 1.—C. P—, æt. 9. Ill one week; the first symptom being itching on the right eyelid, which became inflamed and swollen. When admitted, both eyelids were swollen and œdematous, with an erysipelatous blush around them. Temperature 105°; pulse 156. Noisy delirium. The delirium increased, and he died 36 hours after admission. *Post-mortem.*—Suppuration in right orbit, extending backwards into the cranium, where slight localised meningitis had occurred in the neighbourhood of the optic nerve. Numerous scattered pyæmic abscesses in the lungs.

Case 2.—J. C—, æt. 16, an errand boy. Fell off a horse 9 days before admission, but felt nothing wrong till 4 days later, when he was seized with severe pain in the right side of the chest, cough, dyspnœa, and slight shivering. On admission, respiration hurried, catching, painful. Great tenderness on right side of sternum in the 4th interspace. Slight dulness at right base, but no friction. Temperature 102° to 104°. Four days later pain in the leg, followed by swelling of the ankle and lower part of leg; red, and obscurely fluctuating. Similar swellings occurred over the thigh and on the right arm. Loud double friction heard over the heart on the 4th day, and continued till death; and on the 5th day from admission a prominent fluctuating swelling, with widely diffused redness around it, appeared to the right of the sternum. Later, other swellings appeared on the face and arms; and a pustular eruption scattered over the trunk, arms, and face. Temperature very irregular, varying from 100° to 105°. *Post-mortem.*—An abscess in the anterior mediastinum adherent to the sternum; diffuse suppuration over the front of the chest, and also scattered through the limbs. Multiple abscesses in the lungs. Pus in the right elbow-joint and in the left ankle-joint.

Case 3.—W. W—, æt. 25, a carpenter. Had been suffering from a violent 'cold in the head' and giddiness for 3 weeks, with some discharge from the right ear, and attacks of vertigo and vomiting. Some days before admission he had attacks of shivering, occurring at repeated intervals; and about the same time a swelling on the outer side of the right leg, and another on the ball of the left thumb. On admission the swellings were very marked, red and tender; there was also swelling and redness over the little toe of the right foot, and some tenderness and swelling about the right temporal bone. Temperature irregular, 99·2° to 104°. Occasional attacks of shivering. Some slight delirium. Large

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doses of quinine were given, and 6 days after admission abscesses were opened in the left thumb, the right leg, and the sole of the foot. Bacteria were found in the pus by Dr. Burdon Sanderson and Mr. Wagstaffe. The patient was treated by large doses of quinine and the free administration of food and stimulants, and left the hospital well 6 weeks after admission.

Case 4.—T. K—, æt. 16, a warehouse boy. Admitted for supposed fever of 5 days' duration. Very delirious, with high temperature, and died in about 30 hours. *Post-mortem.*—Acute necrosis of femur. Secondary abscesses in the heart-wall and in the lungs. Acute pericarditis and pleurisy.

Case 5.—J. M—, æt. 2½. Admitted for convulsions of continuous character, which were said to have come on suddenly. The temperature varied from 96° to 106·4° in 3 hours, and the child died 9 hours after admission. *Post-mortem.*—A small punctured wound on sole of right foot. Acute suppuration of glands of groin; secondary abscesses in spleen.

Case 6.—F. S—, æt. 19, soldier. Chronic otorrhœa, following scarlet fever eight years before. Increase of discharge from left ear, with deafness and fever in head, 3 weeks before admission. Rigors, vomiting, &c., before admission. In hospital 17 days. Repeated rigors, delirium, double optic neuritis. Death gradual from exhaustion. *Post-mortem.*—Caries of left internal ear and mastoid cells; thrombosis of lateral and superior longitudinal sinuses; pyæmic abscesses in lungs and in cellular tissue.

RHEUMATISM.

171 cases: 89 males; 82 females. Males: acute, 57; subacute, 29; chronic, 2; gonorrhœal, 1. Females: acute, 53; subacute, 27; chronic, 2.

Number of attack.—1st in 30 males and 36 females; 2nd in 28 males and 27 females; 3rd in 11 males and 10 females; 4th in 7 males and 6 females; more than 4 previous attacks, or number not stated, in 10 males and 1 female.

Age of patients suffering from 1st attack:

	5—10.	11—15.	16—20.	21—25.	26—30.	Beyond 30.
30 Males	4	5	7	3	5	6
36 Females	2	6	10	10	3	5

Age, at time of 1st attack, of patients suffering from 2nd or later attacks:

	5—10.	11—15.	16—20.	21—25.	26—30.	Beyond 30.
56 Males	4	12	18	12	4	6
45 Females	4	13	16	6	—	6

MALES.

Pericarditis was present in 33 males, or 38·4 per cent.; severely in 3; slightly in 8. It was found with first attack in 15, with second in 9, with third in 6, and in 3 cases in which the number of attack is indefinite.

Endocarditis was present in 24 cases, or 28 per cent.; 11 were suffering from first attack, 8 from the second, 4 from the third, and 1 from the fourth.

Peri- and endocarditis existed together in 10 of these cases.

In 14 cases in which endocarditis existed, either alone or with pericarditis, there was a murmur when the patient left the hospital.

Old disease existed in 21 cases at the time of admission: Mitral in 16; mitral and aortic in 3; aortic in 2.

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Other complications: Pneumonia, 4; pleurisy, 1; delirium, 1; delusions, 1; hyperpyrexia, 1; chronic rheumatic arthritis, 1; thrombosis of popliteal vein, 1; epistaxis, 1; roseola, 1; secondary syphilis, 1.

FEMALES.

Pericarditis was present in 33 cases, or in 40·25 per cent. It was severe in 3, slight in 5. It was found with the first attack in 15, second in 10, third in 4, with the fourth in 2, and fifth in 1.

Endocarditis was found in 18 cases, or 22 per cent.; and a murmur was audible in 15 of these cases at the time of the patient leaving the hospital.

Old cardiac disease was found in 14 cases: in 12 as mitral; in 1 as mitral and aortic; in 1 as aortic.

Other complications: Bronchitis, 2, one severely; pleurisy, 1; phthisis, 1; tonsillitis, 1; erythema, 1; psoriasis, 1; chorea, 1.

Pericarditis was present more often amongst males than amongst females, whilst endocarditis was more often present amongst females; a murmur persisted in nearly equal proportion in both sexes.

Age of patients suffering from pericarditis, endocarditis, or both:

	Years: 5—10.	11—15.	16—20.	21—25.	26—30	Beyond 30.
FEMALES—						
Pericarditis	2	6	14	9	1	1
Endocarditis	2	3	4	5	1	3
Murmur persists	2	1	4	5	1	1
MALES—						
Pericarditis	2	4	4	10	4	9
Endocarditis	2	3	8	5	3	3
Murmur persists	0	3	6	2	2	1

ACUTE PNEUMONIA.

There were in all 60 cases of acute pneumonia under treatment during the year. These were divided as follows:

Males . 41 cases . C. 28 R. 2 . D. 11 · Average mortality, 27 p. c.
Females . 19 cases . C. 17 — . D. 2 . „ „ 10·5 p. c.

The following table will show which lung was affected, and the number of patients admitted at various ages:

	Under 10.	10—20.	20—30.	30—40.	40—50.	Over 50.	Total No. of cases.	Died.
Right Lung—								
Males	1	3	11	3	1	1	20	5
Females	0	2	6	2	0	1	11	1
Left Lung—								
Males	0	7	1	0	1	0	9	0
Females	1	1	1	0	1	1	5	1
Both Lungs—								
Males	0	1	4	3	3	1	12	6
Females	1	1	1	0	0	0	3	0
	3	15	24	8	6	4	60	13

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The number of fatal cases in each series is indicated by the last column.

From this it will be seen that the disease was far more common in males than females, in the proportion of nearly 2 to 1. The proportional frequency of affection of one or other lung is nearly equal in both sexes; but double pneumonia was far more frequent and more fatal in males than females.

Disease of the right lung, whilst far more common in males than females, was also far more fatal in them, the average mortality being: for males, 20 per cent.; for females, about 9 per cent. Right pneumonia, whilst of more frequent occurrence in both sexes than left in the proportion of more than 2 to 1, was less frequent in males under the age of 20; the largest number of cases of affection of the left lung occurring below that age.

The relative frequency of affection of each lung, judging from these cases, is: Right, 51·6 per cent.; left, 23·3 per cent.; double, 25 per cent. These ratios agree very closely with those quoted by Dr. Peacock, in his 'Report on Cases of Pneumonia' ('St. Thos. Hosp. Rep., 1874'), except that the number of cases of double pneumonia is rather high. On examining the cases, it appears that two cases may possibly be excluded: one of these being an obscure case, in which thrombosis of the femoral vein occurred, and which from other symptoms may not improbably have been a case of enteric fever. Another was a case of some duration, and resembled rather a case of phthisis with an acute pneumonic attack.

Neither of these cases was verified by a *post-mortem* examination. In another case an aneurism of the abdominal aorta was discovered *post-mortem*, and the distribution and general characters of the inflammation did not correspond with those usually observed in ordinary acute pneumonia.

No case was fatal under the age of 20, the youngest being a man aged 23. But amongst males 5 fatal cases occurred between 25 and 30; 2 between 30 and 40; 2 between 40 and 50; and 1 over 60. The fatal cases of females were aged 43 and 70 respectively.

The duration of the disease before death was doubtful in 1; 6 days, 1; 7 days, 3; 9 days, 1; 10 days, 1.; 11 days, 1; 13 days, 1: 16 days, 1; 7 weeks, 1; 8 weeks, 2; 12 weeks, 1. The last-mentioned case was one which was followed by rapid phthisis, which had probably been latent before.

HÆMOPTYSIS.

6 cases: 4 M., 2 F. Cured, 1 F.; relieved, 2 M., 1 F.; unrelieved, 1 M.; died, 1 M.

One male (*James C—*) admitted with rigor, and temperature 103°. Next day herpetic eruption on ears and adjacent parts; on left ala nasi, a little on left maxillary region and on outer side of right forearm, between edge of ulna and radius. Diarrhœa.

Hæmoptysis came on suddenly 3 weeks after admission, and was going on at date of discharge.

PHTHISIS.

67 cases: M. 29; F. 38. Relieved, 16 M.; 23 F.; unrelieved, 2 M., 6 F.; died, 11 M., 9 F.

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Ages.—The ages were as follow:

	Under 10.	10-20.	20-30.	30-40.	40-50.	50-60.	60-70.	Above 70.
Males	1	2	9	8	5	1	5	0
Females	1	6	16	5	6	2	0	1
	2	8	25	13	11	3	5	1

Showing a relatively greater frequency at an earlier age in the male than the female sex; the highest number of cases in both sexes being between 20 and 30.

Disease most marked in *right* lung in 5 M., 9 F.; in *left* lung in 3 M., 7 F. It existed to same extent in both lungs in 15 M., 12 F. Indefinite, 6 M., 10 F.

Hæmoptysis occurred before admission or during stay in hospital in 30 cases: 11 M., 19 F. Had not occurred up to the time of patient leaving the hospital in 22 cases: 10 M., 12 F. Not noted in 15 cases: 8 M., 7 F.

Complication.—Males: Bronchitis, 3; pneumonia, 1; albuminuria, 2; chronic alcoholism and thrombosis of femoral vein, 1.

Females: Tubercular meningitis and laryngitis, 1; tubercle in optic thalamus, 1; bronchitis, 5.

PLEURISY.

15 cases: Males, 9; females, 6. C., 10; R., 3; D., 2.

In addition to these 9 male cases, 1 case recorded under the head of tubercular meningitis (*q. v.*). Of these 10 cases, 5 were on the left, 4 on the right, and 1 double. Of the fatal cases, 2 were left, 1 right. In the case of double affection there were rather acute symptoms, but very little effusion. Two of the cases were slight, but complicated with acute bronchitis. In 1 case there was moderate effusion on the left side, but the patient suffered from cirrhosis of the liver, and ascites developed during his stay in the hospital, becoming the chief affection. In the remaining 5 cases, 2 of which were fatal, there was considerable effusion.

Paracentesis was performed in 4 cases, as follows:

1. J. S—, æt. 39, a labourer. Admitted April 10th, under Dr. Clapton. A heavy drinker; had suffered from cough some time. Seriously ill 1 month: inability to lie on left side a fortnight.

On admission.—Very heavy and stout, aspect of chronic alcoholism; severe dyspnœa. Right side absolutely dull front and back from apex to base, with total loss of breath sounds, &c., and the side bulged. April 13th.—Ordered Inf. Digit. ʒjss t. d. 18th.—Paracentesis, 41 oz. of clear fluid removed, without any effect on the dulness of chest. 20th.—Breathing easier, very slight resonance just below right clavicle. Was subsequently treated with blisters to side; inunction of mercurial ointment; and Liq. Hyd Terch. ʒss, Pot. Iod. gr. vi t. d. The absolute dulness continued, and the dyspnœa increased; ascites supervening 2 days before death, on May 17th.

Post-mortem.—Right pleura completely filled with clear yellowish fluid (9 pints removed), mediastinum entirely pushed to left of middle line; pleura forming a layer ½ in. thick everywhere over collapsed lung. Intense congestion of kidneys.

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2. J. W., æt. 16, a van boy. Ill 8 weeks: onset sudden, from chill. Admitted April 9th.

On admission.—Dyspnœa, hurried breathing, face flushed, &c. Whole left side impaired resonance front and back. Absolute dulness from third rib in front and spine of scapula behind, with signs of fluid effusion. Heart's apex 3½ inches to right of sternum outside right nipple. Paracentesis on April 11th, 37 oz. of clear fluid removed. Heart returned to left side immediately after the operation, and respiratory sounds heard in upper half of left lung. Breathing much relieved. Symptoms, however, did not improve rapidly, and therefore, on April 23rd, the operation was repeated, and 36 oz. of fluid, still clear, were removed. Subsequently hectic fever, and signs of suppuration; and paracentesis was again performed, pus being removed. Head symptoms set in, and death occurred on June 29th.

Post-mortem.—Left pleura contained 6 oz. pus, and lung compressed. Right pleura—recent inflammation, contained 2 pints of fluid. Yellowish granulations and yellow cheesy matter in upper lobes of both lungs. Bronchial glands not caseous, but swollen and containing granulations. Brain—injection of pia mater generally, with small ecchymoses and some recent lymph; distension of ventricles.

3.—J. H—, æt. 40, warehouseman. Admitted May 1st. Dyspnœa a month; left off work a fortnight. Whole right side absolutely dull, except slight area at apex, and other signs of effusion. Slight improvement. Paracentesis May 11th, 38 oz. of fluid removed. Operation followed by gradual absorption of fluid. Discharged cured, July 10th.

4.—W. B—, æt. 17, builder's labourer. Admitted May 29th. For 3 weeks cough; shivering and pain in right side at onset. *On admission.*—Right side full of fluid. Paracentesis, 60 oz. of serous fluid removed, on May 30th, with great relief. Discharged cured, July 30th, with side retracted.

Females.—6 cases. 3 right, 3 left. Only 1 of any importance.

A girl, æt. 12. Admitted July 13th. Ill 8 days. *On admission.*—Whole left side dull, with obliterated intercostal spaces. Paracentesis, 69 oz. of fluid removed. Great relief and rapid improvement. Discharged August 23rd.

EMPYEMA.

8 cases: Males, 5. 4 fatal; 1 disharged moribund.

Case 1.—R. S—, æt. 40. (See Table VIII, in last 'Rep.,' Case 7.) Readmitted January 22nd. Discharged February 25th, moribund. Empyema (probably) opening into lung, followed by gangrene of lung.

2.—G. R—, æt. 15, paperhanger. Admitted May 27th, 1873. Treated by paracentesis and drainage-tube. Lardaceous degeneration of viscera followed. Died April 22nd, 1874.

3.—T. A—, æt. 26. Admitted August 26th. Left empyema of 5 months' duration. Phthisis, tubercular meningitis (*q. v.*). Died August 31st.

4.—E. T. N—, æt. 3. Left empyema. Admitted Oct. 26th. Paracentesis. Died Nov. 8th. No *post-mortem*. This case probably post-scarlatinal.

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5.—J. B—, æt. 6. Admitted Dec. 24th. Died the same day. Right empyema following scarlet fever.

Females.—4 cases (including 1 readmission). 2 fatal.

1.—M. A. N—, æt. 14. Ill 6 months when admitted, July 31st, 1873, with left empyema, which had pointed and been opened in 4 places before admission. Sinuses discharging much pus. Gradual emaciation. Died March 22nd, 1874.

Post-mortem.—Caries of ribs and lower vertebræ. A large ulcerated cavity of right pleura. Acute tuberculosis of right lung. Cheesy degeneration of uterus and Fallopian tubes. Lardaceous degeneration of viscera.

2.—S. W—, æt. 42. Admitted July 13th. Ill 4 weeks. Left side completely dull and motionless. Hectic fever. Patient died quite suddenly on August 10th.

Post-mortem.—Left pleura filled with thick curdy pus; lung compressed, bound down to spine.

MEDIASTINAL TUMOUR. (Other than Aneurism.)

Only 2 cases. One of doubtful nature with albuminuria. In hospital 9 days. Discharged at his own request. The other with symptoms of mediastinal tumour encroaching on right lung. A male, æt. 35, a butcher. Died. No *post-mortem*.

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SURGICAL REPORT.

1874.

By SAMUEL OSBORN,

SURGICAL REGISTRAR.

General Statement.

Number of beds		220	
„ patients in hospital January 1st, 1874		198	
„ „ admitted during the year 1874		1752	Males 1049, Females 703
		1950	1752
„ „ in hospital December 31st, 1874		192	
„ „ treated during the year 1874		1758	

		Males.	Females.
Discharged cured	1028	671	357
„ relieved	318	175	143
„ on other grounds	223	83	140
„ dead	183	120	63
	1752	1049	703

Average number of deaths 9·5 per cent.
„ stay in hospital 34 days.

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TABLE I.—*Abstract, showing Diseases, Injuries, &c., in Classes, according to Authorised Nomenclature.*

	Total.		Ages.									Result.				Average stay in hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	D.	
I. GENERAL DISEASES.																
Syphilis—																
Primary	2	19	...	...	...	16	5	...	...	...	...	8	5	8	...	5
Secondary	15	58	...	...	...	36	29	6	...	2	...	27	22	23	1	67
Chronic osteo-arthritis	...	2	...	...	...	...	...	...	...	2	...	...	1	1	...	44
II. NERVOUS SYSTEM.																
Diseases—																
Tetanus	2	...	...	1	...	...	...	1	...	...	...	1	...	...	1	28
Neuralgia	2	1	...	...	...	...	2	...	1	...	...	1	1	1	...	8
Injuries—																
Concussion,																
Cerebral	44	6	3	9	8	8	7	7	5	2	1	42	2	3	3	12
Spinal	6	2	...	...	...	...	2	2	3	...	1	6	...	1	1	10
Paralysis after injury	2	...	...	...	...	...	...	1	1	...	...	...	1	1	...	5
III. ORGANS OF SENSE.																
Injuries to eye	1	3	...	1	1	...	...	...	2	...	...	2	2	...	...	23
Foreign bodies in external meatus	...	2	1	1	...	...	...	...	...	...	...	2	...	...	...	2
IV. ORGANS OF CIRCULATION.																
Diseases—																
Aneurysm	5	...	...	...	...	...	1	3	1	...	...	3	...	1	1	21
Epistaxis	3	1	...	...	...	...	...	...	2	2	...	3	1	...	...	23
Hæmorrhages	3	3	...	1	1	..	2	1	1	...	...	5	...	...	1	21
Varix	3	1	...	...	...	...	1	1	1	...	1	4	...	...	...	27
Phlebitis	1	1	...	...	...	...	1	1	...	...	...	1	1	...	...	22
V. RESPIRATORY ORGANS.																
Œdema of glottis	1	...	...	1	...	...	...	...	...	...	...	...	...	...	1	15
Diphtheria	2	3	5	..	...	...	...	...	...	...	..	...	...	...	5	2
Croup	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	2
Laryngitis	1	...	...	...	...	...	...	1	...	...	...	...	1	...	...	18
Impairment of speech	1	1	...	...	1	1	...	...	...	...	...	...	1	1	...	16
VI. DIGESTIVE SYSTEM.																
Injuries—																
Hernia—																
Reducible,																
Femoral	...	3	...	...	...	...	...	1	...	2	...	3	...	...	...	7
Inguinal	11	1	...	...	...	1	3	1	4	3	...	12	...	..	...	12
Irreducible,																
Inguinal	1	...	...	...	...	...	...	1	...	...	...	...	1	...	...	94
Ventral	1	...	...	...	...	...	...	...	...	1	...	...	...	1	...	2
Strangulated,																
Femoral	...	7	...	...	...	...	1	2	2	1	1	5	...	...	2	55
Inguinal	9	...	...	...	...	...	2	...	2	1	4	3	...	...	6	12

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TABLE I.—***Abstract, showing Diseases, Injuries, &c., in Classes, according to Authorised Nomenclature***—continued.

	Total.		Ages.									Result.				Average stay in hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	D.	
DIGESTIVE SYSTEM—*continued.*																
Diseases—																
Rectum—																
Fistula, fissure, abscess	19	4	...	...	...	2	5	4	4	6	2	18	4	1	...	38
Stricture—																
Simple	...	2	...	...	...	1	...	...	1	...	...	...	1	1	...	32
Malignant	...	1	...	...	...	...	...	...	...	1	...	...	...	1	...	5
Prolapse	...	1	...	...	...	...	...	...	1	...	...	...	1	...	...	45
Hæmorrhoids—																
Internal	4	4	...	...	...	1	...	3	3	1	...	3	3	2	...	24
Intero-external	...	3	...	...	...	...	1	2	...	...	...	2	1	...	...	82
External	3	1	...	...	...	...	1	1	2	...	...	3	...	1	...	16
Recto-urinary fistula	5	...	...	...	...	...	...	2	3	...	...	1	3	...	1	47
Recto-vaginal fistula	...	3	...	...	...	...	1	...	1	1	...	...	1	2	...	41
VII. GENITO-URINARY SYSTEM.																
Diseases—																
Calculus	9	...	2	...	...	3	...	...	1	1	2	5	1	1	2	61
Incontinence of urine	1	1	...	...	1	...	1	...	...	...	...	...	...	2	...	20
Hæmaturia	3	...	...	...	...	...	1	...	...	1	1	2	1	...	...	12
Enlarged prostate	3	...	...	...	...	...	1	...	...	2	...	1	1	...	1	10
Retention	9	...	...	...	...	2	...	...	...	2	5	6	2	...	1	10
Stricture	29	...	...	...	...	...	7	8	4	6	4	17	10	...	2	32
Gonorrhœa	1	22	...	...	1	13	8	...	1	...	...	6	2	15	...	26
Urinary fistula	5	...	...	...	...	...	1	...	2	2	...	1	2	1	1	23
Sores on penis	7	...	...	...	...	2	4	...	...	1	...	5	2	..	...	36
Phimosis	2	...	...	...	...	...	1	...	1	...	...	1	1	...	...	7
Adherent prepuce	1	...	1	...	...	...	...	...	...	...	...	...	1	...	...	11
Orchitis	2	...	...	...	...	...	...	2	...	...	...	2	...	...	...	4
Sarcocele	1	...	...	...	...	...	...	...	1	...	...	...	1	...	...	25
Hernia testis	2	...	...	1	...	1	...	...	...	...	...	2	...	...	...	39
Neuralgia „	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...	7
Undescended testicle	2	...	...	...	...	1	...	1	...	...	...	1	...	1	...	5
Hydrocele	10	1	...	...	...	1	2	1	2	1	4	9	...	2	...	20
Hæmatocele	2	...	...	...	...	...	...	...	...	1	1	1	1	...	...	44
Spermatocele	1	...	...	...	...	...	...	...	...	1	...	1	...	...	...	16
Varicocele	3	...	...	...	...	...	3	...	...	...	...	1	1	1	...	33
Vaginal discharge	...	20	...	...	...	16	4	...	...	...	...	7	2	11	...	40
Sores on vulva	...	9	...	...	...	8	1	...	...	...	...	5	1	3	...	58
Suppressio mensium	...	1	...	...	...	...	1	...	...	...	...	...	...	1	...	5
Metritis	...	1	...	...	...	...	1	...	...	...	...	...	...	1	...	10
Cystocele	...	1	...	...	...	...	...	...	1	...	...	...	...	1	...	12
Retroversion of uterus	...	2	...	...	...	...	1	...	...	1	...	1	...	1	...	8
Vesico-vaginal fistula	...	7	...	...	...	...	4	3	...	...	...	1	3	3	...	58
Injuries—																
Lacerated kidney	1	...	...	...	...	...	...	1	...	...	...	1	...	...	...	12
Ruptured urethra	3	...	...	1	...	...	...	...	1	1	...	3	...	...	...	46

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TABLE I.—*Abstract showing Diseases, Injuries, &c., in Classes, according to Authorised Nomenclature*—continued.

	Total.		Ages.									Result.				Average stay in hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	D.	
VIII. GLANDULAR SYSTEM.																
Diseases—																
Adenitis	1	7	...	...	...	3	2	2	1	...	...	4	1	2	1	25
Hypertrophy	1	2	...	...	...	1	2	...	...	...	...	...	...	3	...	10
IX. ORGANS OF LOCOMOTION. OSSEOUS SYSTEM.																
Diseases—																
Periostitis	7	1	1	2	2	2	...	...	1	...	...	4	2	1	1	28
Ostitis	1	2	...	...	3	...	...	...	...	...	...	...	3	...	...	37
Necrosis	32	17	1	4	11	7	12	10	1	2	1	25	19	2	3	66
Caries	5	2	...	...	1	...	1	2	1	...	2	2	3	1	1	79
Abscess	...	1	...	...	...	...	...	...	1	...	...	1	...	...	...	33
Neuralgia	1	...	...	...	...	1	...	...	...	...	...	...	1	...	...	15
Ununited fracture	2	...	...	...	...	...	...	...	2	...	...	...	2	...	...	45
Joints—																
Knee	34	32	7	19	5	5	16	8	4	1	1	25	25	6	10	96
Hip	30	21	5	20	9	11	4	...	...	2	...	11	21	13	6	126
Elbow	10	1	1	2	1	2	2	2	...	1	...	3	4	4	...	71
Wrist	3	1	...	...	...	2	1	1	...	...	...	2	2	...	...	77
Ankle	5	4	2	...	4	...	2	...	1	...	...	3	4	2	...	91
Shoulder	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...	1
Carpus	...	1	...	...	...	...	...	...	...	1	...	1	...	...	...	118
Tarsus and metatarsus	2	2	1	...	1	1	1	...	...	...	...	1	2	1	...	152
Synovitis—																
Acute	17	4	...	...	1	2	6	8	3	1	...	18	3	...	...	26
Chronic	4	5	...	...	3	...	1	2	1	1	1	8	1	...	...	45
Spine	7	5	7	2	1	1	1	...	...	...	...	...	2	9	1	24
Anchylosis of joints	3	3	...	1	...	...	5	...	...	...	...	1	5	...	...	42
Hysterical disease „	...	4	...	...	...	...	3	1	...	...	...	2	2	...	...	26
Ganglion	1	2	...	...	...	1	2	...	...	...	...	1	2	...	...	68
Bursæ	1	18	...	...	2	5	9	3	...	...	...	15	4	...	...	30
Rice body	1	...	...	...	...	1	...	...	...	...	...	1	...	...	...	54
Injuries—																
Sprains—																
Knee	4	3	...	1	1	...	2	3	...	...	...	6	...	1	...	64
Ankle	12	2	1	2	...	4	4	1	1	1	...	13	1	...	...	11
Shoulder	...	1	...	1	...	...	...	...	...	...	...	...	1	...	...	85
Hip	2	1	...	...	...	...	1	1	1	...	...	3	...	...	...	17
Spine	2	...	...	...	...	...	...	1	1	...	...	2	...	...	...	12
Fractures—																
Simple—																
Skull	11	1	4	1	...	...	1	6	...	...	...	5	1	1	5	17
Facial bones	4	...	...	2	...	...	...	1	1	...	...	3	1	...	...	15
Ribs	12	5	...	2	...	...	1	2	5	6	1	12	1	...	4	19
Spine	2	...	...	...	...	...	1	...	1	...	...	...	...	...	2	37
Pelvis	4	1	1	1	...	1	1	...	1	...	...	4	...	...	1	26
Clavicle	5	1	...	...	1	...	1	1	1	2	...	6	...	...	...	26

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TABLE I.—*Abstract, showing Diseases, Injuries, &c., in Classes, according to Authorised Nomenclature*—continued.

	Total.		Ages.								Result.				Average stay in hospital in days.
	M.	F.	5	10	15	20	30	40	50	60 +	C.	R.	U.	D.	
ORGANS OF LOCOMOTION—*continued.*															
Humerus	14	1	2	2	1	4	1	1	3	... 1	10	3	1	1	29
Radius and ulna	4	...	1	2	1	...	...	...	...	... ..	2	2	...	...	13
Radius	...	1	...	...	...	...	...	...	...	... 1	1	...	...	...	47
Ulna	1	1	...	...	...	...	...	...	1	... 1	1	1	...	...	13
Femur	29	12	12	5	3	...	2	...	8	3 8	36	2	...	3	51
Patella	12	6	...	...	...	...	5	5	5	3 ...	15	3	...	...	49
Tibia and fibula	61	13	1	8	3	5	14	17	8	10 8	71	...	...	3	36
Tibia	22	2	4	5	3	1	3	5	1	2 ...	22	1	1	...	25
Fibula	19	6	...	...	3	...	6	7	7	2 ...	23	2	...	...	21
Bones of hand	1	...	...	1	...	...	...	...	...	... ...	1	...	...	...	8
Bones of foot	2	1	...	...	...	...	2	...	...	1 ...	3	...	...	...	18
Separation of epiphysis	...	1	1	...	...	...	...	...	...	... ...	1	...	...	...	18
Compound—															
Skull	7	1	2	2	1	...	...	2	...	1 ...	3	...	1	4	25
Facial bones	4	2	...	...	1	2	...	1	1	1 ...	4	2	...	...	23
Femur	4	...	...	...	1	...	1	...	2	... ...	1	...	...	3	13
Tibia and fibula	10	6	1	...	2	...	1	1	4	5 2	6	1	...	9	43
Tibia	2	1	...	...	...	...	1	...	1	... 1	1	...	...	2	45
Humerus	5	...	...	1	1	...	...	2	...	... 1	3	...	...	2	22
Radius and ulna	4	...	...	...	1	...	1	2	...	... ...	3	...	...	1	27
Ulna	1	...	...	...	...	...	...	1	...	... ...	1	...	...	...	49
Bones of hand	5	1	...	...	...	3	...	2	1	... ...	4	1	...	1	38
Bones of foot	4	1	...	...	...	...	2	2	1	... ...	4	...	...	1	46
Dislocations—															
Humerus	6	1	...	...	...	...	...	1	1	3 1 1	5	...	2	...	12
Elbow-joint	2	...	...	...	1	...	...	...	...	... 1	...	1	1	...	49
Hip	3	...	...	1	...	...	2	...	...	... ...	3	...	...	...	21
Tarsus	2	...	...	...	...	...	...	1	1	.. ...	2	...	...	...	62
Semilunar cartilage	1	...	...	...	...	...	...	...	...	1 ...	1	...	...	...	21
X. CELLULAR TISSUE.															
Inflammation	44	31	5	3	6	3	13	14	16	8 7	55	5	...	15	30
Abscess—															
Head and neck	...	2	...	...	...	...	1	1	...	... ...	1	1	...	...	7
Extremities	13	13	5	3	3	3	1	4	4	3 ...	19	6	1	...	32
Trunk	11	14	1	...	...	8	4	7	3	1 1	17	5	1	2	37
Psoas and lumbar	6	1	2	1	3	...	...	1	...	... ...	3	3	...	1	78
Mammary	...	2	...	...	...	...	1	1	...	... ...	2	...	...	...	38
Gangrene	4	1	1	1	...	...	...	...	...	... 3	3	1	...	1	33
Tension of fascia	...	1	...	...	...	...	...	1	...	... ...	...	...	1	...	11
XI. CUTANEOUS SYSTEM.															
Diseases—															
Eruptions	2	12	1	1	...	4	4	1	1	1 1	5	6	3	...	37
Ulcers	19	26	1	1	7	2	9	10	10	4 1	27	16	2	...	52
Sinus	...	1	...	...	1	...	...	...	...	... ...	1	...	...	...	191

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Table I.—*Abstract, showing Diseases, Injuries, &c., in Classes, according to Authorised Nomenclature*—continued.

	Total.		Ages.									Result.				Average stay in hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	D.	
Cutaneous System—*continued.*																
Boil and carbuncle	5	1	...	...	...	1	...	...	2	1	2	5	...	...	1	33
Onychia	...	1	...	...	...	...	1	...	...	...	...	...	1	...	...	4
Ingrowing toe-nail	3	1	...	...	1	3	...	...	...	...	...	4	...	...	...	26
Injuries—																
Burns	18	16	12	5	3	3	5	1	1	3	1	19	1	3	11	40
Scalds	17	15	27	...	3	...	1	1	...	...	...	23	1	2	6	12
Wounds—																
1. Incised—																
Head	5	2	...	...	...	1	2	4	...	...	...	6	1	...	...	22
Throat	5	1	...	...	...	...	...	2	1	2	1	4	...	...	2	17
Extremities	9	2	...	1	3	2	1	...	2	1	1	8	1	2	...	26
Trunk	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...	58
2. Lacerated—																
Head	16	3	1	2	1	1	4	3	4	1	2	14	3	...	2	12
Extremities	12	3	2	...	4	3	4	1	...	...	1	13	...	1	1	44
Trunk	3	2	1	...	1	1	2	...	...	...	...	5	...	...	...	17
3. Contused—																
Head	8	7	4	1	3	2	2	1	1	...	1	14	...	1	...	9
Extremities	19	5	5	2	2	2	5	3	2	2	1	23	...	1	...	14
Trunk	32	7	2	6	4	2	13	5	3	2	2	32	1	3	3	7
4. Punctured—																
Throat	...	1	...	...	...	...	1	...	...	...	...	1	...	...	...	7
Thorax	2	...	...	...	...	...	1	...	1	...	...	1	...	1	...	4
Extremities	5	...	...	1	1	...	1	1	...	1	...	5	...	...	...	29
Gunshot wound	1	...	...	1	...	...	...	...	...	...	...	...	...	...	1	11
Ruptured tendon	1	1	...	...	...	...	...	2	...	...	...	2	...	...	...	56
XII. Deformities.																
Talipes varus	5	5	6	1	1	2	...	...	...	...	...	3	7	...	...	170
„ valgus	...	2	...	1	...	1	...	...	...	...	...	...	2	...	...	75
„ equino-varus	1	3	2	1	...	...	...	...	1	...	...	1	1	1	1	109
Spray foot	...	1	...	...	...	...	...	1	...	...	...	...	1	...	...	31
Contraction of plantar fascia	2	...	...	1	1	...	...	...	...	...	...	...	2	...	...	80
Rigidity of fingers	...	1	...	...	...	...	...	1	...	...	...	...	1	...	...	13
Torticollis	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...	30
Contraction after burn	2	4	2	1	2	...	...	...	1	...	...	1	4	1	...	59
Deformities of nose	1	2	...	...	1	...	1	...	...	...	1	1	1	1	...	86
Ruptured perinæum	...	1	...	1	...	...	...	...	...	...	...	1	...	...	...	46
Contracted tendons	1	5	...	...	1	...	3	2	...	...	...	2	4	...	...	78
Knock-kneed	1	...	...	...	1	...	...	...	...	...	...	...	...	1	...	1
Harelip	1	3	4	...	...	...	...	...	...	...	...	1	1	...	2	27
Cleft palate	3	11	4	2	2	...	5	...	...	1	...	3	2	9	...	36
Meningocele	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	3
Spina bifida	2	...	2	...	...	...	...	...	...	...	...	...	...	1	1	5
Extroversio vesicæ	1	...	...	...	...	...	...	1	...	...	...	...	...	1	...	16
Malformation of rectum	1	1	2	...	...	...	...	...	...	...	...	...	...	1	1	2

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TABLE I.—*Abstract, showing Diseases, Injuries, &c., in Classes, according to Authorised Nomenclature*—continued.

	Total.		Ages.									Result.				Average stay in hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U	D.	
DEFORMITIES—*continued.*																
Malformation of fingers and toes	...	1	...	...	1	...	...	...	...	...	...	...	...	...	1	102
XIII. TUMOURS.																
1. Innocent—																
Lipoma	5	7	...	1	...	...	2	1	3	3	2	11	...	1	...	25
Osteoma	3	3	...	...	1	1	2	2	...	...	...	2	1	3	...	51
Papilloma	1	1	...	...	...	...	...	...	...	1	1	1	...	...	1	16
Adenoma	2	11	...	...	...	5	3	4	1	...	...	6	5	1	1	36
Angioma	4	4	8	...	...	...	...	...	...	...	...	1	5	2	..	40
Cysts—																
Sebaceous	1	...	1	...	...	...	...	...	...	...	...	1	...	...	...	20
Dermoid	1	...	...	...	...	1	...	...	...	...	...	1	...	...	...	17
Hæmatoma	...	2	...	...	...	...	1	1	...	...	...	2	...	...	...	12
Hydatid	1	1	...	...	...	1	...	...	1	...	...	...	...	...	2	16
Ovarian	...	12	...	...	...	...	4	3	2	1	2	3	...	1	8	42
2. Semi-malignant—																
Sarcoma	7	5	1	1	...	2	2	1	1	3	1	4	1	3	4	29
Fibro-cystic	...	1	...	...	...	...	...	...	...	1	...	...	...	...	1	10
Myxoma	...	2	...	...	...	...	2	...	...	...	...	2	...	...	...	46
3. Malignant—																
Lymphomata	2	1	...	1	1	...	1	...	...	...	...	...	...	3	...	48
Carcinoma	7	15	...	...	...	...	...	4	7	6	5	8	..	5	9	32
Epithelioma	12	1	...	...	...	...	...	2	3	5	3	6	3	3	1	27
Of doubtful nature	7	5	...	...	...	3	2	1	3	...	3	3	1	6	2	74
XIV. UNCLASSIFIED AND TRIVIAL	14	15	...	1	5	7	6	5	3	1	1	6	7	11	5	15
Total 1752	1049	703	171	144	145	242	341	255	208	145	101	1028	318	223	183	34

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SUMMARY OF DISEASES AND INJURIES, ETC., IN CLASSES.

I.—GENERAL DISEASES.

Males.—C. 4, R. 11, U. 1, D. 1.

Females.—C. 31, R. 17, U. 31, D. 0.

Syphilis, primary.—21; 2 M., chancre indurated, 4 and 6 days after connection; glandular enlargement. 19 F.; chancre indurated, with glandular enlargement in nearly all cases; 10 with secondary eruptions.

Syphilis, secondary.—73; 15 M., 5 skin diseases, 2 disease of testis, 3 ulceration, 1 necrosis, 2 warts, 1 disease of rectum, 1 nodes. 58 F., 27 skin diseases, 31 warts and mucous tubercles, 9 ulceration, 2 aphonia, 1 onychia, 1 disease of rectum, 1 nodes, 1 iritis, 1 hypertrophy of labia.

Chronic osteo-arthritis.—2; 2 F., disease situated in lower extremities, and one had also sciatica.

II.—NERVOUS SYSTEM.

Males.—C. 45, R. 2, U. 6, D. 3.

Females.—C. 5, R. 2, U. 0, D. 2.

DISEASES.

Tetanus.—2; 2 M., 1st male, age 38, acute; cause, crush of great toe. Toe amputated. Died in 4 days. 2nd male, age 9, chronic; cause, fall on back of head. Hydrate of chloral administered. Recovery.

Neuralgia.—3; 2 M., with sciatica. 1 F., also with hysterical neuralgia along the course of sciatic nerve.

INJURIES.

Concussion.—50 (cerebral); 44 M., in two or three cases fracture of skull suspected. 6 F.

Concussion.—8 (spinal); 6 M., 2 no paralysis of motion or sensation in extremities, 2 partial loss in both extremities, 1 complete loss in both extremities; 1 complete loss in one extremity. 2 F.; 1 partial loss of motion and sensation in both arms and legs, 1 no paralysis.

Paralysis after injury.—2; 2 M., 1 with loss of power in thigh after fracture sixteen months previously, and 1 with paralysis of left side of face after fracture of skull.

III.—ORGANS OF SENSE.

Males.—C. 1, R. 0, U. 0, D. 0.

Females.—C. 3, R. 2, U. 0, D. 0.

Diseases of the eye being treated in a special department, only injuries treated in the general wards are here enumerated.

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Injuries to eye.—4: 1 M., injury so severe as to necessitate extirpation of eyeball. 3 F., 1 had rupture of cornea and subsequently traumatic cataract, the other had in addition rupture of capsule and extraction of lens and eye completely spoilt, and was subsequently admitted for extirpation.

Foreign bodies in external meatus.—2: 2 F., in both cases removed under chloroform, syringing having failed.

IV.—ORGANS OF CIRCULATION.

Males.—C. 11, R. 1, U. 1, D. 2.

Females.—C. 5, R. 1, U. 0, D. 0.

DISEASES.

Aneurysm.—5: 5 M., 1 traumatic aneurysm of ulna artery cured by digital compression after 94 hours (see 'Lancet,' Dec. 19th, 1874); 2 popliteal aneurysms cured by digital compression in the one case in 23 hours, in the other in 17 hours (see 'Lancet,' Nov. 14th, Dec. 19th, 1874); 1 traumatic aneurism of common femoral artery refused to undergo treatment; 1 aneurism of arch of aorta, for which tracheotomy was performed, subsequently died from rupture of aneurysm.

Epistaxis.—4: 3 M., 1 F.; in 2 posterior nares was plugged, in 2 the anterior.

Hæmorrhages.—6: 3 M., 2 cases of hæmophilen, 1 aged 14, cured by punctures with Ergot and Tinctura Ferri Perchlor. internally; the other, aged 24, under the same treatment died from hæmorrhage from puncture in thigh; 1 male, with hæmorrhage from penis. 3 F., 1 after removal of tonsil, 1 hæmorrhage from vagina after a kick, 1 secondary hæmorrhage from punctured wound of palm.

Varix.—4: 3 M., 2 males came in with ruptured varicose veins treated by pad and bandages, the other underwent radical cure by Mr. H. Lee's method. 1 F. also underwent the same method of radical cure.

Phlebitis.—2: 1 M., 1 F.; both cases occurring in saphena vein.

V.—RESPIRATORY ORGANS.

Males.—C. 0, R. 2, U. 0, D. 4.

Females.—C. 0, R. 0, U. 1, D. 3.

Œdema of glottis.—1: 1 M., due to injury, tracheotomy performed, death from lung complication 15 days after operation.

Diphtheria and croup.—6: 3 M., 3 F., in all of which tracheotomy was performed on the day of admission with a fatal result in all cases.

Laryngitis.—1: 1 M., probably syphilitic, although no history obtainable, relieved by Pot. Iod.

Impairment of speech.—2: 1 M., 1 F.; 1 due to former tracheotomy, 1 congenital.

VI.—DIGESTIVE SYSTEM.

Males.—C. 35, R. 8, U. 3, D. 7.

Females.—C. 15, R. 7, U. 6, D. 2.

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INJURIES.

Hernia, reducible.—15: 11 M., 4 F., 3 of which were femoral, 12 inguinal; nearly all had symptoms more or less of strangulation; 9 were reduced by taxis, 4 by taxis under chloroform, and 2 reduced by ice-bag. All the femoral occurring in females, and the inguinal, with one exception, in males. In 1 man, aged 39, the radical cure by Wood's method was successfully performed, Wutzer's operation having failed in a former operation performed when in India.

Irreducible.—2: 2 M., 1 ventral and 1 inguinal.

Strangulated (femoral).—7: 7 F., 1, aged 68, ruptured 16 years, symptoms of strangulation 2 days, sac opened, entero-epiplocele, died 47 days after operation from heart disease; 2, aged 48, ruptured 12 years, pain and sickness 7 days, erysipelas on admission, died 34 days after operation from general debility; 3, aged 30, ruptured 9 years, has worn truss, sac not opened, miscarriage 4 days after operation, cured 75 days; 4, aged 40, strangulated 7 or 8 hours, erysipelas of wound 3 days after operation, cured 117 days; 5, aged 57, ruptured 28 years, pain and sickness 5 days, sac opened, entero-epiplocele, cured in 36 days; 6, aged 34, ruptured 2 years, sickness and vomiting 4 days, sac not opened, cured in 43 days; 7, aged 45, ruptured 5 years, never worn truss, strangulated 12 hours, sac opened, cured in 37 days.

Strangulated (inguinal).—9: 9 M., 1, aged 24, greengrocer, ruptured right side 7 days when lifting a sack of potatoes; taxis by local practitioner, 3 days after followed by orchitis, with continuation of stercoraceous vomiting and pain, sac opened but nothing found, died 2 days after; *post-mortem*, peritonitis and internal strangulation by band of omentum adherent to right testicle; 2, aged 78, clerk, ruptured 30 years right side, sac not opened, died 24 hours; *post-mortem*, congestion of intestine. 3, aged 42, horse-keeper, ruptured left side, sac opened, enterocele, strangulation at internal ring, died 24 hours; *post-mortem*, another sac found constricting a coil of intestine. 4, aged 65, a butler, ruptured left side, sac opened, died 24 hours after. 5, aged 21, printer, ruptured right side 9 years, never worn truss, strangulation 9 hours, sac opened, undescended testicle on left side, cured 28 days. 6, aged 57, labourer, ruptured right 15 side years, has worn truss but not last 5 months, symptoms 3 days, sac opened, cured 45 days. 7, aged 47, railway porter, ruptured right side 14 years, has worn truss, strangulated 7 hours, sac not opened, incision healed by first intention. 8, aged 69, cabman, ruptured left side 35 years, has worn truss, vomiting and pain 4 days, sac not opened, died 5 days after operation.

Rectum and anus.—Fistula 19: 18 M., 1 F.; 2 internal, 11 external, 6 complete; only 3 out of the 19 had pulmonary symptoms. Fissure, 3 F.; Abscess, 1 M.; Stricture, 3 F., 2 simple, 1 malignant; Prolapse, 1 F, removal by actual cautery after ligature. Hæmorrhoids, 15: 7 M., 8 F.; 8 internal, 4 external, 3 intero-external; seven cases underwent operation for their removal by clamp and actual cautery. Recto-urinary fistula, 5 M.; 3 recto-urethral; 2 recto-vesical; 1 occurring after lithotomy, 2 complicated with urethral stricture, 2 with ulceration and constriction of rectum. Recto-vaginal fistula, 3 F.; 2 complicated with constriction of rectum.

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VII.—GENITO-URINARY SYSTEM.

Males.—C. 59, R. 25, U. 7, D. 7.

Females.—C. 20, R. 7, U. 38, D. 0.

DISEASES.

Calculus.—9: 9 M., lithotomy in 6 cases, lithotrity in 2, one case taken away by parents. 1, aged 16, Brixton, oxalate of lime, lithotomy, cured, 52 days (see Lancet,' Oct. 24th, 1874). 2, aged 2, Walworth, probably oxalate of lime, taken away by parents. 3, aged 75, New Cross, phosphatic, lithotrity, 5 sittings, cured 41 days (see 'Lancet,' Oct. 24th, 1874). 4, aged 79, surgeon, Bayswater, phosphatic, lithotrity, 1 sitting, died, no *post-mortem*. 5, aged 18, Essex, oxalate of lime and phosphates, lithotomy, cured 63 days (see 'Lancet,' Oct. 24th, 1874). 6, aged 20, Essex, ammonio-magnesian phosphate, lithotomy, cured 67 days. 7, aged 49, Chelsea, phosphatic, lithotomy, death in 25 days from pulmonary embolism. 8, aged 2, Walworth, uric acid, lithotomy, cured 42 days. 9, aged 59, Hackney, uric acid, lithotomy, cured 154 days.

Incontinence of Urine.—2: 1 M., Liq. vesicatorius over sacrum, ext. belladonna gr. ¼ o. n., Tinct. Ferri Perchlor. ♏. xv, b. d., unrelieved. 1 F., coming on after difficult labour, deformity of urethra, unrelieved.

Hæmaturia.—3: 3 M., C. 2, R. 1.

Enlarged prostate.—3: 3 M., 1 due to inflammation, 1 hypertrophied and 1 cancerous.

Retention.—9: 9 M., 5 of whom had also enlarged prostate.

Stricture.—29: 29 M., 17 coming on after gonorrhœa, 1 after lithotomy.

Gonorrhœa.—23: 1 M., 22 F., C. 6, R. 2, U. 15.

Urinary fistula.—5: 5 M., 2 due to ulceration, behind stricture, 1 of which was readmitted for ulceration about wound.

Soft sores on penis.—7: 7 M., 3 with bubo.

Phimosis.—2: 2 M., C. 1, R. 1, one congenital, one cicatricial.

Adherent prepuce.—1: 1 M., R. 1, symptoms of stone.

Orchitis.—2: 2 M., C. 2, both after gonorrhœa.

Sarcocele.—1: 1 M., R. 1, associated with hydrocele and probably syphilitic.

Hernia testis.—2: 2 M., C. 2. Attributable to injury.

Neuralgia testis.—1: 1 M., U. 1.

Undescended testicle.—2: 2 M., 1, aged 19, left side, hernia on same side, has worn truss; 2, aged 35, right side, hernia on same side, has worn truss, had 3 children.

Hydrocele.—11: 10 M.; 5 had been tapped previously, 2 previously tapped and injected with iodine; 2 were only tapped, and 7 tapped and injected with iodine. 4 occurred on right side, 4 on left, and 2 double. 1 F.; left side, worn truss supposing it to be a hernia, tapped and injected with iodiue.

Hæmatocele.—2: 2 M., both on left side, and associated with previous hydrocele.

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Spermatocele.—1: 1 M., left side, tapped and injected with Sol. Zinci Chloride gr. xl ad ʒj. Cured.

Varicocele.—3: 3 M., both on left side. 1 primarily treated with galvanism and cold, and subsequently readmitted. Both cured by pins, ligature, and subcutaneous division.

Vaginal discharge.—20: 20 F., C. 7, R. 2, U. 11. Questionable whether some were not gonorrhœal.

Sores on vulva.—9: 9 F., C. 5, R. 1, U. 3.

Suppressio menses.—1: 1 F., U. 1. Married, has pain and swelling of abdomen at monthly periods.

Metritis.—1: 1 F., 1 Cystocele, 1 Retroversion; all of whom were transferred to medical ward under Dr. Barnes.

Vesico-vaginal fistula.—7: 7 F., 3 readmitted, 4 underwent operation. 1 cured, 3 relieved.

INJURIES.

Lacerated kidney.—1: 1 M., hæmaturia for 3 days after kick in right loin. Cured.

Ruptured urethra.—3: 3 M., C. 3. In 1 catheter passed into bladder, 2 had perineal section performed.

VIII.—GLANDULAR SYSTEM.

Males.—C. 0, R. 1, U. 1, D. 0.
Females.—C. 4, R. 0, U. 4, D 1.

DISEASES.

Adenitis.—3: 1 M., 7 F. C. 4, R. 1, U. 2, D. 1. 1 female, aged 27, axillary adenitis; death from septicæmia and hæmorrhage.

Hypertrophy.—3: 1 M., 2 F. U. 3.

IX.—ORGANS OF LOCOMOTION.

Males.—C. 289, R. 81, U. 31, D. 49.
Females.—C. 117, R. 50, U. 16, D. 15.

DISEASES.

Periostitis.—8: 7 M., 1 F.; 4 traumatic, 4 other causes. 1 case terminated fatally from pyæmia.

Ostitis.—3: 1 M., 2 F.; all of strumous diathesis.

Necrosis.—49: 32 M., 17 F.; 5 were multiple, 3 were admitted with necrosis of jaw, 1 of clavicle, 1 of humerus, 1 of radius, 6 of phalanges, 1 of os innominatum, 10 of femur, 10 of tibia, 3 of fibula, and 5 of tarsus and metatarsus, 3 of skull. Operations were performed in 29 cases and sequestra removed, incisions were made into acute suppuration about bone in 4, and amputation in 3 cases. 1 death from chloroform during operation.

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Caries.—7: 5 M., 2 F. Situation of disease: tibia 2, tarsus 2, vertebræ 3. In 1 case of caries of tarsal bones Syme's amputation was performed; in 2 cases of caries of spine, psoas abscess was present; the third in a boy, aged 15, with caries of 1st and 2nd cervical vertebræ, terminated fatally from rupture of transverse ligament and compression of medulla oblongata (see 'Lancet,' July 11th, 1874).

Abscess of bone.—1: 1 F., in antrum.

Neuralgia of bone.—1: 1 M., in tibia.

Ununited fracture.—2: 2 M., same patient readmitted. Humerus after injury. Unrelieved.

JOINTS.

Knee.—66: 34 M., 32 F.; C. 25, R. 25, U. 6, D. 10. In 6 cases amputation was performed, in 11 excision, 2 amputated after excision. In the 13 cases of excision origin of disease was synovial in 6 cases, bone in 7. Death occurred in 4 of these excisions; 1 from pyæmia, 2 from septicæmia, 1 from tubercular meningitis. Average term of residence in hospital after excision 198 days.

Hip.—51: 30 M., 21 F.; C. 11, R. 21, U. 13, D. 6. In the 6 fatal cases 1 was due to pyæmia, 2 to septicæmia, 2 to excessive suppuration, 1 to amyloid degeneration. 12 cases had excision performed. Both hips were affected in 2 cases, 1 cured without excision, the other relieved after double excision.

Elbow.—11: 10 M., 1 F.; C. 3, R. 4, U. 4. In 4 cases excision was performed, in 1 amputation.

Wrist.—4: 3 M., 1 F.; C. 2, R. 2. Excision performed in 1 case.

Ankle.—9: 5 M., 4 F.; C. 3, R. 4, U. 2. Subastragaloid excision in 1 case, removal of sequestrum from tibia in another, in a third Syme's amputation was performed; in all cases with satisfactory result.

Shoulder.—1: 1 M., U. 1.

Carpus.—1: 1 F., C. 1. Removal of necrosed unciform bone.

Tarsus and metatarsus.—4: 2 M., 2 F.; C. 1, R. 2, U. 1. In 1 Syme's amputation was performed with satisfactory result.

Synovitis, acute.—21: 17 M., 4 F.; C. 18, R. 3. 17 traumatic in origin, 2 with probable rupture of ligaments.

Synovitis, chronic.—9: 4 M., 5 F.; C. 8, R. 1. Origin in 3 cases rheumatic, 2 traumatic.

Spine.—12: 7 M., 5 F.; R. 2, U. 9, D. 1. 3 associated with psoas abscess, 2 of which were punctured by aspirator trochar under "antiseptic veil."

Anchylosis of joints.—6: 3 M., 3 F.; C. 1, R. 5. 2 of knee, 1 of elbow, 2 of wrist and fingers, 1 of both hips. Forcible extension and flexion performed under chloroform in 3 cases.

Hysterical disease of joints.—4: 4 F., C. 2, R. 2. Treated with pill assafœtida co. gr. v, o. n., Mist. Q. c. F. ℥ t. d. 2 of hip, 2 of knee.

Ganglion.—3: 1 M., 2 F.; C. 1, R. 2. 2 were compound ganglia on palmar surface of wrist, both contained rice bodies. Treated by incision above annular ligament; the third was situated over base of metatarsal bone of great toe.

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Bursæ.—19: 1 M., 18 F.; C. 15, R. 4. 1 male, inflamed bursa under gluteus maximus, treated by incision; 18 females with bursa patellæ, 12 being acutely inflamed, 4 with chronic inflammation, 2 with bursal tumours. 13 occurred in servants from kneeling. 9 were treated by incision; the 2 bursal tumours were removed.

Rice body.—1: 1 M., C. 1. Transfixion and subcutaneous division, absorption by pressure.

INJURIES.

Sprains—knee.—7: 4 M., 3 F.; C. 6, U. 1.

Ankle.—14: 12 M., 2 F.; C. 13, R. 1.

Shoulder.—1: 1 M., R. 1.

Hip.—3: 2 M., 1 F.; C. 3.

Spine.—2: 2 M., C. 2. All had symptoms more or less of concussion.

Fractures—Skull, vault of.—Simple 8, compound 8, total 16. 15 M., 1 F., C. 8, R. 1, U. 2, D. 5. In 4 depression; 4 cases trephined, 3 of which terminated fatally.

Skull, base of.—4: 3 M., 1 F., D. 4.

Facial bones.—Simple 4, compound 6, total 10: 8 M., 2 F., C. 7, R. 3. 2 of superior maxilla, 3 of nasal, 3 of inferior maxilla, and 2 of nasal and superior maxilla.

Ribs.—Simple, 17: 12 M., 5 F., C. 12, R. 1, D. 4. 1 male, aged 44, died; also laceration of right lobe of liver. 2, aged 45, died; hæmothorax and double pneumonia. 1 female, aged 25, died; laceration of lung substance. 2, aged 8, died from hæmothorax.

Spine.—2: 2 M., D. 2. 1, aged 27, fracture between sixth and seventh cervical; had erysipelas in bedsore, died 73 days after admission from pyæmia. 2, aged 44, fracture in lower cervical region, died 2 days after admission.

Pelvis.—5: 4 M., 1 F., C. 4, D. 1. Ruptured urethra in 2 cases, neither required perineal section; 1 had also fracture of tibia and fibula, and died on the day of admission.

Clavicle.—6: 5 M., 1 F., C. 6. 1 male, aged 23, medical student, comminuted fracture.

Humerus.—Simple 15, compound 5, total 20: 19 M., 1 F., C. 13, R. 3, U. 1, D. 3. 1 male, aged 16, subcoracoid dislocation of opposite humerus, reduced by knee in axilla. 2, aged 62, with dislocation of head into axilla, unreduced. 4 cases underwent amputation, 2 of which terminated fatally; 1 from pyæmia and the other from shock.

Radius and ulna.—Simple 4, compound 4, total 8: 8 M., C. 5, R. 2, D. 1. 1 with also fracture of humerus, 2 underwent amputation successfully, and another with fracture of femur and several ribs died on the day of admission.

Radius.—Simple 1: 1 M., C. 1.

Ulna.—Simple 2, compound 1, total 3: 2 M., 1 F., C. 2, R. 1. 1 with also fractured ribs.

Femur.—Simple 41, compound 4, total 45: 33 M., 12 F., C. 37, R. 2, D. 6; 2 of which were intracapsular. 1 male, aged 48, double amputation, recovery; 2, aged

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14, died 10 days after admission from tetanus coming on 7 days after accident; 3, aged 27, amputation, death from shock.

Patella.—18: 12 M., 6 F., C. 15, R. 3. 1 intracapsular, and 1 stellate with comminuted fracture of femur and concussion.

Tibia and fibula.—Simple 74, compound 16, total 90: 71 M., 19 F., C. 77, R. 1, D. 12. 2 had also fracture of humerus, 1 subcoracoid dislocation of humerus, 1 also with compound comminuted fracture of radius and ulna, as well as compound comminuted fracture of both legs. 15 were comminuted, and 5 underwent amputation.

Tibia.—Simple 24, compound 3, total 27: 24 M., 3 F., C. 23, R. 1, U. 1, D. 2. Only 1 was comminuted, 1 associated with dislocation of radius backwards, and 1 underwent amputation.

Bones of hand.—Simple 1, compound 6, total 7: 6 M., 1 F., C. 5, R. 1, D. 1. 5 were comminuted, 1 had also fracture of tibia and fibula, and 5 were amputated.

Bones of foot.—Simple 3, compound 5, total 8: 6 M., 2 F., C. 7, D. 1. 2 were comminuted, 1 amputated by Syme's method, and 1 amputated below knee.

Separation of epiphysis.—1: 1 F., 1 C. 1, aged 1¾, separation of lower epiphysis of femur.

Dislocations—Humerus.—7: 6 M., 1 F., C. 5, U. 2. 5 were subcoracoid and reduced under chloroform; 1 readmitted on account of redislocation, glenoid cavity having disappeared, reduction was not kept in position without the aid of mechanical apparatus; 1 subclavicular also reduced under chloroform.

Elbow-joint.—2: 2 M., C. 1, R. 1. 1, aged 54, dislocation of both bones backwards and outwards, accident, cured; 2, aged 12, dislocation of both bones outwards, one month duration, unreduced.

Hip.—3: 3 M., C. 3. 2 dislocations on to dorsum ilii, 1 into obturator foramen; all of which were reduced by manipulation.

Tarsus—2: 2 M., C. 2. 1, aged 24, dislocation of internal and middle cuneiform bones; reduction by manipulation. 2, aged 38, compound dislocation and comminuted fracture of fibula; amputation below tubercle of tibia; recovery.

Dislocation of semilunar cartilage.—1: 1 M., C. 1.

X.—CELLULAR TISSUE.

Males.—C. 52, R. 13, U. 0, D. 13.

Females.—C. 48, R. 8, U. 3, D. 6.

Inflammation.—75: 44 M., 31 F., C. 55, R. 5, D. 15. 1 underwent amputation above the wrist, and another amputation of index finger; 1 came in with peritonitis and died; and 2 with pelvic cellulitis; 1 died from chloroform previous to amputation.

Abscess—head and neck.—2: 2 F., C. 1, R. 1. Both alveolar from decayed teeth.

Extremities.—26: 13 M., 13 F., C. 19, R. 6, U. 1. 22 were of lower extremity, 4 of upper extremity.

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Trunk.—25 : 11 M., 14 F., C. 17, R. 5, U. 1, D. 2., two of which were perineal.

Psoas and lumbar.—7 : 6 M., 1 F., C. 3, R. 3, D. 1. 4 were psoas, 1 was lumbar, 2 were psoas and lumbar ; 2 or more probably associated with diseased spine.

Mammary abscess.—2 : 2 F., C. 2.

Gangrene.—5 : 4 M., 1 F., C. 3, R. 1, D. 1, all of toes.

Tension of fascia.—1 : 1 F., U. 1.

XI.—CUTANEOUS SYSTEM.

Males.—C. 146, R. 12, U. 10, D. 15.

Females.—C. 67, R. 19, U. 9, D. 12.

DISEASES.

Eruptions.—14 : 2 M., 12 F., C. 5, R. 6, D. 3. 2 were cases of erythema, 4 of eczema, 1 of pemphigus, 3 of scabies, 2 of psoriasis, 1 of lupus, and 1 of elephantiasis.

Ulcers.—45 : 19 M., 26 F., C. 27, R. 16, U. 2 ; 36 being of lower extremity 4 being associated with varicose veins, 2 of upper extremity, 4 of head and neck, and 3 of trunk.

Sinus.—1 : 1 F., C. 1. Free incision.

Boil and carbuncle.—6 : 5 M., 1 F., C. 5, D. 1 ; 5 of which were carbuncles situated on the nape of neck.

Onychia.—1 : 1 F., R. 1. Probably syphilitic, toe-nail removed, Pot. Iod. internally.

Ingrowing toe-nail.—4 : 3 M., 1 F., C. 4. Toe-nail removed in 2 cases, the others being treated by strapping.

INJURIES.

Burns.—34 : 18 M., 16 F., C. 19, R. 1, U. 3, D. 11. Of the fatal cases all but one were burns of the trunk, the other being a burn of both hands. Of the fatal cases 7 lived less than 1 day, 1 less than 4 days, and the others 9, 10, and 17 days respectively ; 7 were under 5 years of age, 3 over 55. The treatment adopted for all cases was the immediate application of a paste formed by the mixture of whiting and olive oil.

Scalds.—32 : 17 M., 15 F., C. 23, R. 1, U. 2, D. 6. Of the fatal cases 4 were severely scalded on the trunk, 1 on face, arms and hands, and 1 of mouth and throat, all happening in children under 2 years of age. The treatment adopted was the same as for the burns, viz. whiting and olive oil.

WOUNDS.

Incised—Head.—7 : 5 M., 2 F., C. 6, R. 1. Slight concussion in 2 cases, but, otherwise, all trivial cases.

Throat.—6 : 5 M., 1 F., C. 4, D. 2. In 3 cases the larynx was not opened, 1 of these proved fatal on the second day from congestion and emphysema of lungs, an other on the second day from valvular disease of heart. In 3 cases the larynx was opened through the thyro-hyoid membrane.

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Extremities.—11: 9 M., 2 F.; C. 8, R. 1, U. 2. 5 being of lower extremity, 6 of upper extremity; 1 involved the elbow-joint, and 1 had gangrene of little finger.

Trunk.—1: 1 M.; C. 1. Incised wound of buttock, glass still in wound, removed under chloroform.

Lacerated.—Head.—19: 16 M., 3 F.; C. 14, R. 3, D. 2. In 2 of the scalp wounds there was stripping up of periosteum; the 2 fatal cases were both wounds of scalp; in 1 erysipelas followed three days after admission, death from granular kidneys; in the other erysipelas appeared the day after admission, and death occurred from profuse hæmorrhage from temporal artery; 5 others were followed by erysipelas.

Extremities.—15; 12 M., 3 F.; C. 13, U. 1, D. 1. 7 were of the upper extremity, 2 of which had erysipelas, and 1 gangrene; 8 were of the lower extremity, 3 of which had erysipelas, and 1 gangrene. In the fatal case erysipelas appeared one month after admission; amputation above knee subsequently performed, death from excessive suppuration. In 1 case of gangrene amputation was performed below knee with recovery.

Trunk.—5: 3 M., 2 F.; C. 5. All trivial cases.

Contused.—Head.—15: 8 M., 7 F.; C. 14, U. 1. All trivial cases.

Extremities.—24: 19 M., 5 F.; C. 23, U. 1. 21 being of lower extremity, 3 of upper extremity.

Trunk.—39: 32 M., 7 F.; C. 32, R. 1, U. 3, D. 3. In 2 probable rupture of kidney, hæmaturia, cured; another, probably rupture of liver, cured; 1 buffer injury, probable rupture of intestine, death in twenty-four hours, no *post mortem*.

Punctured.—Throat.—1: 1 F.; C. 1. In posterior triangle.

Thorax.—2: 2 M.; C. 1, U. 1. 1 caused by penknife situated two inches from sternum, in second right intercostal space; the other trivial.

Extremities.—5: 5 M.; C. 5. All of lower extremity.

Gunshot.—Hand.—1: 1 M.; D. 1. A boy aged 10, followed on the seventh day by tetanus, amputation, and hydrate of chloral internally; death eleven days after admission.

Ruptured tendon.—2: 1 M., 1 F.; C. 2. 1 of some fibres of erector spinæ, the other of rectus femoris.

XII.—DEFORMITIES.

Males.—C. 5, R. 9, U. 5, D. 4.

Females.—C. 9, R. 17, U. 11, D. 3.

Talipes varus.—10: 5 M., 5 F.; C. 3, R. 7. 7 were congenital, 3 paralytic; tenotomy performed in 7 cases, tendo Achillis in 5 cases, plantar fascia in 2.

Talipes valgus.—2: 2 F.; R. 2. Scarpa's shoe.

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Talipes-equino-varus.—4: 1 M., 3 F.; C. 1, R. 1, U. 1, D. 1. 1 occurring after fracture with anchylosis of ankle-joint was successfully amputated below knee. Division of tendo Achillis in 2 cases; the fatal case had erysipelas after tenotomy, and died from diphtheria after tracheotomy had been performed.

Spray foot.—1: 1 F.; R. 1; treated with convex splints.

Contraction of plantar fascia.—2: 2 M.; R. 2; plantar fascia divided in both cases.

Rigidity of fingers.—1: 1 F.; R. 1; forcible flexion under chloroform.

Torticollis.—1: 1 M.; C. 1; division of sternal portion of sterno-mastoid.

Contraction after burn.—6: 2 M., 4 F.; C. 1, R. 4, U. 1. 3 of neck; 1 underwent operation; 1 of hand, cured by operation under M. Esmarch's plan; 2 of elbow.

Deformities of nose.—3: 1 M., 2 F.; C. 1, R. 1, U. 1. 1 operated upon for cleft in nostril after removal of lipoma, and another had rhinoplastic operation performed.

Ruptured perinæum.—1: 1 F.; C. 1; by operation.

Contracted tendons.—6: 1 M., 5 F.; C. 2, R. 4; 5 being of hamstrings; 1 of flexors of wrist; tenotomy in 1 case performed.

Knock-kneed.—1: 1 M.; U. 1.

Harelip.—4: 1 M., 3 F.; C. 1, R. 1, D. 2. 3 single and 1 double with snout; 2 associated with cleft palate; 3 were operated upon. In the 2 fatal cases there was no *post mortem*.

Cleft palate.—14: 3 M., 11 F.; C. 3, R. 2, U. 9. Harelip formerly in one case; 7 underwent operation, 3 were in hard and soft palate, 7 in soft palate, and 4 in hard palate.

Meningocele.—1: 1 M.; D. 1; removal, death from convulsions.

Spina bifida.—2: 2 M.; U. 1, D. 1. Neither were operated upon; the fatal case died from bronchitis.

Extroversio vesicæ.—1: 1 M.; U. 1; would not submit to operation.

Malformations of rectum.—2: 1 M., 1 F.; U. 1, D. 1. The fatal case was operated upon, absence of anus and rectum found too far up to allow of mucous membrane being attached to skin.

Malformation of fingers and toes.—1: 1 F.; D. 1. Webbed condition of thumb and first finger of both hands, and also webbed condition of feet; operation; subsequently erysipelas and death.

XIII.—TUMOURS.

Males.—C. 20, R. 8, U. 15, D. 10.

Females.—C. 31, R. 8, U. 13, D. 19.

Innocent—Lipoma.—12: 5 M., 7 F.; C. 11, U. 1; 11 of which were removed successfully under chloroform; 3 of arm, 7 of trunk, 1 of nose, 1 of neck.

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Osteoma.—6: 3 M., 3 F.; C. 2, R. 1, U. 3. 2 of trunk, 2 of femur, 1 of tibia and 1 exostosis of ungual phalanx removed under chloroform.

Papilloma.—2: 1 M., 1 F.; C. 1, D. 1. Both of mouth, removed under chloroform by galvano-cautery.

Adenoma.—13: 2 M., 11 F.; C. 6, R. 5, U. 1, D. 1. 7 of breast, 4 of neck, 1 of tongue, 1 of arm. The 2 latter underwent operation, as well as 1 of breast and 2 of neck. The fatal case was one of tumour in parotid region removed under chloroform, and followed four days after by erysipelas.

Angioma.—8: 4 M., 4 F.; C. 1, R. 5, U. 2. All were in children under 1 year of age, 5 of which were operated upon, 3 of neck, 1 of upper lip, 2 of cheek, 1 of leg, 1 of scalp.

Cysts—sebaceous.—1: 1 M.; C. 1; in arm, removal.

Dermoid.—1: 1 M.; C. 1; congenital, situated between eyebrows, contained hair; removal.

Hæmatoma.—2: 2 F.; C. 2. In both cases history of injury, one in buttock, the other in labia; treated by ice bag.

Hydatid.—2: D. 2, 1 male, aged 45, supposed psoas abscess, death from septicæmia; see 'Lancet,' June 5th, 1875; 1 female, aged 20, supposed ovarian tumour; operation commenced, hydatid found springing from liver; death from peritonitis.

Ovarian.—12: 12 F.; C. 3, U. 1, D. 8. Nine underwent removal, 6 of which terminated fatally; one case that was tapped also terminated fatally, the other fatal case died the day after admission from rupture of cyst followed by peritonitis.

Semi-malignant—Sarcoma.—12: 7 M., 5 F.; C. 4, R. 1, U. 3, D. 4. Three were epulis of jaw, only one of which was sufficiently limited to allow of removal, which was done successfully; 1 of neck, 1 one of buttock, 1 in head of tibia for which amputation was successfully performed, recurrence of growth, however, in superior maxillary bone; 1 of nose successfully removed, 1 of humerus, 1 of pelvis, and 1 recurrence of growth in axillary glands after former removal of entire breast, also operated upon.

Fibro-cystic.—1: 1 F.; D. 1; springing from breast, punctured with trocar and canula.

Myxoma.—2: 2 F.; C. 2; of nose, same patient readmitted with recurrence of growth after removal; secondary removal.

Malignant—Lymphomata.—3: 2 M., 1 F.; U. 3; all of cervical glands.

Carcinoma.—22: 7 M., 15 F.; C. 8, U. 5, D. 9; 17 of which were scirrhus; 1 of thigh, 18 of breast, 2 of which were in men; 9 underwent operation, 7 successfully; 1 of uterus, 1 of thoracic wall admitted a second time with recurrence after removal; the tumour of thigh was amputated at the hip-joint, and died from the shock of operation; 5 were of the soft or encephaloid variety, 1 being of upper jaw, 1 of tongue, 3 of breast, one of the latter underwent amputation; subsequently erysipelas and death; no post-mortem.

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Epithelioma.—13 : 12 F., 1 F.; C. 6, R. 3, U. 3, D. 1. Two of lip, 1 removal; 3 of leg, 1 removal; 1 of nose, removal; 4 of tongue, 1 removal; 1 of penis, amputation; 1 in groin, recurrence after amputation of penis; 1 of labia. Of doubtful nature, 12 : 7 M., 5 F.; C. 3, R. 1, U. 6, D. 2; 1 of neck, 1 of bladder, 1 of antrum; 3 of arm, 1 amputated above elbow, recovery; 2 of leg, 2 of breast, 2 of pelvis, in one of which enterotomy was successfully performed.

XIV.—UNCLASSIFIED AND TRIVIAL.

Males.—C. 4, R. 2, U. 3, D. 5.

Females.—C. 2, R. 5, U. 8, D. 0.

M. 14, F. 15; total 29.

Seven transferred to medical wards; 3 came in for artificial appliances; 1 not registered; 3 brought in dead; 10 were medical cases; and 5 with no ailment at all.

COMPLICATIONS.

ERYSIPELAS.

During the year 75 surgical cases were attacked with erysipelas, 43 of which were males, 32 females. 17 occurred after operations, the remaining 58 in suppurating wounds. The two following tables show the numbers affected in each month and in each ward.

Month.	Edward.	Leopold.	Alexandra.	Elizabeth.	Albert.	Victoria.	Magdalen.	Henry.	Total.
January .	2	2	1	2	1	...	...	...	8
February .	3	...	...	3	...	...	...	...	6
March . .	2	1	...	3	1	...	...	...	7
April . .	1	1	...	3	...	2	...	...	7
May . .	...	1	3	1	...	1	1	2	9
June . .	1	1	2	...	1	2	...	...	7
July . .	1	2	2	2	...	1	...	...	8
August .	...	...	...	...	3	...	...	...	3
September	2	1	...	...	1	...	...	...	4
October .	3	...	...	4	...	3	...	...	10
November	2	1	...	1	...	...	...	...	4
December	...	...	...	1	...	...	1	...	2
Totals .	17	10	8	20	7	9	2	2	75

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TABLE II.—*Pyæmia.*

Of which there were 13 cases during the year, the particulars of which are given in the subjoined table.

No.	Ward, date of admission.	Age.	Primary disease or injury.	Operation.	Date of operation.	Onset of pyæmia.	Symptoms in evidence of pyæmia.	Date of death.	Remarks.
1	Elizabeth 25, Nov. 27	27	Auxiliary adenitis	...	...	Dec. 15	Rigors, fluctuating temperature, abscess	Dec. 24	...
2	Leopold 25, Nov. 16	11	Periostitis of femur	...	...	Nov. 18	Rigors, delirium, abscesses and jaundice	Nov. 23	...
3	Victoria 23, Nov. 20	3½	Disease of knee-joint	Excision, then amputation	Mar. 25	April 1	Rigors, abscess in ear	April 7	Post-mortem. No abscesses in liver; necrosis of stump, and dorsal vertebræ; abscess in close connection with spinal cord
4	Leopold 7, April 15	64	Incised wound into knee-joint	...	...	June 10	No rigors, fluctuation of temperature, and frequent perspirations	June 12	Post-mortem. Suppuration about knee-joint; puriform thrombosis of external iliac vein; abscess in left lung.
5	Albert 21, Aug. 31	35	Disease of knee-joint	Amputation in lower ⅓ of femur	Oct. 31	Nov. 4	No rigors, abscesses in different parts, sweet odour of breath, sloughing of stump	Nov. 21	Transfusion of blood. Post-mortem. Abscess in right kidney
6	Alexander 2, Jan. 20	32	Abscess and suppuration about knee-joint	Circular amputation above knee-joint.	Mar. 11	Mar. 12	Rigors, and great fluctuations in temperature	Mar. 21	Subcutaneous injections of carbolic acid. Post-mortem: puriform thrombosis of internal iliac vein; abscesses in lung
7	Victoria 20, Feb. 28	1	Disease of hip-joint	...	...	...	Rigors, and other pyæmic symptoms	Mar. 19	Post-mortem: abscesses in liver, no appearance of lardaceous degeneration

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TABLE II—*continued.*

No.	Ward, date of admission.	Age.	Primary disease or injury.	Operation.	Date of operation	Onset of pyæmia.	Symptoms in evidence of pyæmia.	Date of death.	Remarks.
8	Edward 26, Mar. 28	27	Fracture of spine	...	...	June 6	Rigors, and fluctuating temperature	June 9	Post-mortem: abscesses in spleen and liver, phthisis, abscess in peritoneum; calculus in left kidney
9	Leopold 20, Oct. 2	37	Compnd. fracture of skull	...	...	Oct. 24	Empyema, no rigors, delirium, and varying temperature	Nov. 1	...
10	Alexandra 15, Dec. 27	50	Compnd. fracture of tibia and fibula	...	...	Jan. 6	Rigors, and other pyæmic symptoms	Jan. 19	Post-mortem: abscesses in liver and lungs
11	Leopold 16, Jan. 21	38	Compnd. comminuted fracture of humerus	Flap amputation about middle of arm	Feb. 1	Jan. 23	Rigors, with delirium and fluctuating temperature, with sloughing of stump	Feb. 2	...
12	Edward 21, Jan. 18	35	Compnd. comminuted fracture of hand and fracture of tibia and fibula	Amputation above wrist	Jan. 18	Feb. 10	Rigors, diarrhœa, fluctuating temperatures	Mar. 2	No post-mortem
13	Edward 12, April 22	63	Tumour of thigh, probably sarcoma	...	...	...	No rigors, but frequent perspirations, gangrene of leg	May 27	Post-mortem. Viscera not examined.

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TABLE III.—*Surgical Operations* 1874.

SURGICAL OPERATIONS.	Total.	Sex.		Ages.								Result.			
		M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U	D.
On the EYEBALL.[1]																
Enucleation	2	1	1	...	1	...	...	...	...	1	...	...	2	...	...	...
On ARTERIES.																
Prolonged compression	3	3	...	...	...	...	...	...	3	...	...	...	3	...	...	...
On VEINS.																
Removal of hæmorrhoids	8	2	6	...	...	...	1	...	3	3	1	...	7	1	...	...
Obliteration of varicose veins	2	1	1	...	...	...	...	1	...	1	...	...	2	...	...	...
Ditto, in varicocele	2	2	...	...	...	...	...	2	...	...	...	...	1	1	...	...
On JOINTS.																
Reduction of dislocations—																
a. Shoulder	6	5	1	...	...	...	...	1	1	1	1	2	5	...	1	...
b. Elbow	1	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...
c. Hip	3	3	...	...	1	...	...	2	...	...	...	...	3	...	...	...
Excision of joints—																
a. Elbow	3	2	1	...	1	...	2	...	...	...	...	...	2	1	...	...
b. Hip	8	6	2	...	4	2	...	1	...	...	1	...	5	1	...	2
c. Knee	14	7	7	6	4	1	...	3	...	...	...	...	10	...	1	3
d. Ankle	1	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...
e. Astragalus	1	1	...	...	...	...	...	1	...	...	...	...	...	1	...	...
On BONES.																
Removal of dead bone—																
Upper jaw	1	...	1	...	...	...	...	...	...	1	...	...	1	...	...	...
Lower jaw	2	...	2	...	...	1	...	1	...	...	...	...	1	1	...	...
Humerus	3	1	2	...	...	2	1	...	...	...	...	...	1	2	...	...
Radius	1	1	...	...	...	1	...	...	...	...	...	...	1	...	...	...
Metacarpus and phalanges	2	...	2	...	...	...	...	1	1	...	...	...	2	...	...	...
Femur	5	4	1	...	...	...	1	1	3	...	...	...	2	2	...	1
Tibia	10	5	5	...	1	2	1	2	1	3	...	...	6	3	1	...
Fibula	3	1	2	...	2	...	1	...	...	...	...	...	2	1	...	...
Os calcis	4	4	...	...	1	...	...	2	...	...	...	1	3	1	...	...
Trephining of bone	5	4	1	1	2	1	1	...	...	...	...	...	2	...	...	3
AMPUTATIONS.																
1. *For severe injury—*																
a. Arm	3	3	...	...	1	...	...	...	1	...	...	1	1	...	...	2
b. Hand	6	5	1	...	1	1	1	1	1	1	...	...	4	...	...	2
c. Thigh	5	3	2	1	...	...	...	2	1	...	1	...	1	...	...	4
d. Leg	7	7	...	...	...	1	...	1	1	2	1	1	3	...	...	4
e. Syme's	1	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...
f. Fingers	2	2	...	...	...	...	2	...	...	...	...	...	2	...	...	...
2. *For disease—*																
a. Above elbow	2	2	...	...	...	...	1	...	...	...	1	...	2	...	...	...
b. Forearm	3	2	1	...	...	...	...	...	...	1	2	...	3	...	...	...
c. Fingers	1	1	...	...	...	...	...	...	1	...	...	...	1	...	...	...

[1] The returns of operations in the ophthalmic ward are not included in this table.

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Table III—*continued.*

Surgical Operations.	Total.	Sex.		Ages.									Result.			
		M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	D
Amputations (*continued*).																
d. Hip-joint	1	1	...	...	...	...	...	...	...	1	...	...	...	...	...	1
e. Thigh	11	6	5	2	...	1	2	2	3	1	...	...	5	...	...	6
f. Through knee-joint	1	...	1	...	...	...	...	1	...	...	...	...	1	...	...	...
g. Below knee	4	3	1	...	...	1	1	...	...	2	...	...	4	...	...	...
h. Syme's	3	1	2	...	...	1	...	1	...	1	...	...	3	...	...	...
i. Toe	3	3	...	...	...	...	...	...	2	...	1	...	2	...	...	1
Removal of Tumours.																
Epulis	1	...	1	...	...	...	1	...	...	...	...	...	1	...	...	...
Warts	2	1	1	...	...	...	...	2	...	...	...	...	2	...	...	...
Epithelioma of lip	1	...	1	...	...	...	...	...	...	1	...	...	1	...	...	...
Papilloma	2	1	1	...	...	...	...	...	...	...	1	1	1	...	...	1
Tumour of bursa patellæ	1	...	1	...	...	...	...	1	...	...	...	...	1	...	...	...
Hypertrophy of labia	2	...	2	...	...	...	...	2	...	...	...	...	2	...	...	...
Tumour of thyroid	1	1	...	...	...	...	...	...	1	...	...	...	...	1	...	...
„ parotid	1	...	1	...	...	...	...	...	1	...	...	...	...	...	...	1
„ breast	10	2	8	...	...	...	...	...	4	3	1	2	8	...	...	2
Adenoma	3	...	3	...	...	...	...	3	...	...	...	...	3	...	...	...
Exostoses	1	1	...	...	...	...	1	...	...	...	...	...	1	...	...	...
Angioma	5	2	3	5	...	...	...	...	...	...	...	...	1	4	...	...
Lipoma	13	6	7	...	1	...	1	2	1	3	3	2	13	...	...	...
Cystic tumours	2	2	...	1	...	...	1	...	...	...	...	...	2	...	...	...
Sarcoma	6	2	4	...	...	...	1	2	...	1	2	...	5	...	...	1
Carcinoma	1	1	...	...	...	...	...	...	...	...	1	...	1	...	...	...
Epithelioma	3	3	...	...	...	...	...	...	...	1	1	1	3	...	...	...
Removal of Calculi.																
a. By lithotomy	7	7	...	1	1	...	3	...	...	1	1	...	6	...	...	1
b. By lithotrity	2	2	...	...	...	...	...	...	...	...	...	2	1	...	...	1
Incisions.																
Tracheotomy	10	5	5	8	1	...	...	...	1	...	...	...	...	...	...	10
Colotomy	3	1	2	...	...	1	...	2	...	...	...	...	2	...	...	1
For strangulated hernia	16	10	6	...	...	...	...	3	1	4	4	4	8	...	...	8
For stricture of rectum	1	...	1	...	...	1	...	...	...	...	...	...	...	...	1	...
For prolapsed rectum	2	...	2	...	...	...	...	...	...	2	...	...	...	2	...	...
Slitting of prepuce	2	2	...	...	...	...	1	...	...	1	...	...	2	...	...	...
Perineal section	8	8	...	...	...	2	...	1	2	...	2	1	3	4	...	1
Ovariotomy	8	...	8	...	...	...	...	2	3	1	1	1	2	...	...	6
Tenotomy.																
a. For talipes	11	7	4	5	1	2	3	...	...	...	...	...	1	9	...	1
b. For torticollis	1	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...
Reparative Operations.																
Rhinoplastic	2	1	1	...	...	...	...	1	...	...	...	1	1	1	...	...
For cicatrix of neck	1	...	1	...	...	1	...	...	...	...	...	...	...	1	...	...
„ „ hand	2	...	2	1	1	...	...	...	...	...	...	...	1	1	...	...
For perineal fistula	16	16	...	...	...	...	...	8	2	4	5	2	15	1	...	...

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TABLE III—*continued.*

SURGICAL OPERATIONS.	Total.	Sex.		Ages.									Result.			
		M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	D
REPARATIVE OPERATIONS (*continued*).																
For ruptured perineum	1	...	1	...	1	...	...	...	...	...	...	...	1	...	...	...
Circumcision of prepuce	3	3	...	1	...	...	1	...	...	...	1	...	3	...	...	...
Hypospadias	1	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...
Recto-urinary fistula	2	2	...	...	...	...	...	...	1	1	...	...	...	2	...	...
Vesico-vaginal fistula	4	...	4	...	...	...	...	2	2	...	...	...	1	3	...	...
For ununited fracture	1	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...
FOR DEFORMITIES.																
Harelip	3	..	3	3	...	...	...	...	...	...	...	...	1	1	...	1
Cleft palate	8	3	5	1	1	2	...	4	...	...	...	...	4	2	2	...
Meningocele	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1
Webbed fingers	1	...	1	...	...	1	...	...	...	...	...	...	...	...	...	1
Imperforate anus	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1
OPERATIONS of PARACENTESIS.																
Tapping testis	12	12	...	...	...	...	...	1	2	2	3	4	10	1	1	...
For hydatid cysts of abdomen	1	...	1	...	...	...	1	...	...	...	...	...	...	...	...	1
Bladder per rectum	1	1	...	...	...	...	...	...	...	...	1	...	...	...	...	1
Operations for removal of foreign bodies	2	...	2	1	1	...	...	...	...	...	...	...	2	...	...	...
Totals	332	202	130	39	29	26	32	55	43	46	36	26	205	49	9	69

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TABLE IV.—*Amputations after Severe Injuries.*

No.	Occupation.	Sex.	Age.	Nature of injury.	Place of amputation.	Results.	Time of operation.	Remarks.
1	Labourer	M.	27	Comp. comminuted fracture of leg	Below hip-joint	Death 1 day after operation from shock	On admission	Tram-car accident
2	Clerk	M.	43	Comp. comminuted fracture of tibia and fibula	Below knee-joint	Death 9 days after operation. Erysipelas appeared 5 days after operation	On admission	Suicidal railway accident
3	Labourer	M.	53	Smash of both legs	Double amputation of both legs	Death same day from shock	On admission	Railway accident
4	Labourer	M.	60	Comp. comminuted fracture of tibia and fibula	Below knee	Died 11 days after operation, delirious	On admission	Direct violence from a scaffolding pole
5	School	M.	13	Comp. comminuted fracture of leg	Below tubercle of tibia	Recovery after sloughing of flaps in 122 days	On admission	Wheel of heavily laden waggon passed over his leg
6	Workhouse	M.	71	Compound fracture of tibia	Below knee	Sloughing of stump, death from exhaustion 7 days after admission	On admission	Run over by a heavily laden timber waggon
7	Asphalter	M.	38	Comp. comminuted fracture of humerus	Middle of upper arm	Death from pyæmia the day after amputation	11 days after admission	Tram-car accident
8	Labourer	M.	61	Comp. comminuted fracture of humerus	Middle of upper arm	Died 4 days after from shock	On admission	Railway accident
9	School	M.	6	Comp. comminuted fracture into elbow-joint	Above elbow	Recovery in 24 days	On admission	Caught in the wheel of a cart
10	Railway guard	M.	30	Comp. comminuted fracture of forearm and hand	Below elbow	Recovery in 34 days	On admission	Railway accident
11	Printer	M.	14	Comp. comminuted fracture of hand and forearm	Below elbow	Recovery in 21 days	On admission	Machine accident

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12	Railway guard	M.	35	Smash of hand	Above wrist	Pyæmia 5 days after operation, died 63 days after admission	On admission	Railway accident. No post-mortem
13	Potter	M.	17	Smash of hand	Above wrist	Recovery in 33 days	On admission	Machine accident
14	Wood sawyer	M.	18	Comp. comminuted fracture of phalanges	Of distal phalanges	Recovery in 31 days	On admission	Caused by a circular saw
15	Bargeman	M.	18	Comp. comminuted fracture of thumb and first and second fingers	At metacarpo-phalangeal joints	Recovery in 55 days	On admission	Squeezed between two barges
16	Widow	F.	47	Smash of hand	Above wrist	Recovery in 38 days	On admission	Supposed to have been caused by a tram-car
17	Engineer	M.	23	Smash of foot	At ankle (Syme's)	Recovery in 93 days	On admission	Secondary hæmorrhage. Caught in machinery
18	Engine driver	M.	45	Smash of foot	Below knee-joint	Died 4 days after operation	On admission	Railway accident
19	Labourer	M.	38	Comp. dislocation of foot and comminuted fracture of fibula	Below tubercle of tibia	Recovery in 108 days	28 days after admission	Caused by a kick
20	Railway porter	M.	22	Smash of foot	Below knee	Recovery in 57 days	27 days after admission	Railway accident. Rigor on the day of operation, believed to be pyæmic; suppuration in ankle-joint ...
21	Married	F.	39	Lacerated wound of leg, and suppuration of knee-joint	Above knee	Died from shock of operation	3 months after admission	
22	School	M.	10	Gunshot wound of hand, thumb blown off	Above wrist	Died 11 days after injury, 4 days after operation	7 days after admission	Tetanus appeared 7 days after admission, when amputation was performed and subcutaneous injections of hydrate of chloral
23	Married	F.	29	Comp. comminuted fracture of leg	Above knee-joint	Sloughing of stump, died 98 days after admission	On admission	Phlebitis of veins of left leg. Railway accident
24	Child	M.	5	Comp. fracture of femur, and lacerated wound of thigh	Upper third of femur	Recovery in 184 days	On admission	Run over by a tram-car

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OF
St. Thomas's Hospital.

HONORARY CONSULTING PHYSICIANS.

T. A. Barker, M.D. Cantab. et Edin.
J. Risdon Bennett, M.D. Edin., F.R.S.

HONORARY CONSULTING SURGEON.

F. Le Gros Clark, Esq., F.R.S.

PHYSICIANS.

T. B. Peacock, M.D. Edin.; J. S. Bristowe, M.D. Lond.;
W. H. Stone, M.B. Oxon.; C. Murchison, M.D. Edin., F.R.S.

OBSTETRIC PHYSICIAN.

H. Gervis, M.D. Lond.

SURGEONS.

John Simon, Esq., F.R.S., D.C.L.; Sydney Jones, Esq.;
John Croft, Esq.; William Mac Cormac, Esq.

OPHTHALMIC SURGEON.

R. Liebreich, Esq.

ASSISTANT PHYSICIANS.

W. M. Ord, M.B. Lond.; J. Harley, M.D. Lond.;
J. F. Payne, M.B. Oxon.

ASSISTANT OBSTETRIC PHYSICIAN.

Robert Cory, M.B. Cantab.

ASSISTANT SURGEONS.

F. Mason, Esq.,; Henry Arnott, Esq.;
W. W. Wagstaffe, Esq.

DENTAL SURGEON.

J. W. Elliott, Esq.

ASSISTANT DENTAL SURGEON.

W. G. Ranger, Esq.

RESIDENT ASSISTANT PHYSICIAN.

F. C. Turner, M.A., M.D. Cantab.

RESIDENT ASSISTANT SURGEON.

A. O. Mc Kellar, Esq.

APOTHECARY.

Mr. W. R. Jones.

ANALYTICAL CHEMIST.

Albert J. Bernays, M.A., Ph.D.

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LECTURERS.

Dr. Peacock Dr. Murchison	Medicine.
Mr. Sydney Jones Mr. Wm. Mac Cormac	Surgery.
Dr. Bristowe	General Pathology.
Mr. F. Mason Mr. W. W. Wagstaffe	Descriptive Anatomy.
Dr. Ord Dr. John Harley	General Anatomy and Physiology.
Mr. Liebreich	Ophthalmic Surgery.
Dr. Bernays	Chemistry and Practical Chemistry.
Dr. Gervis	Midwifery, and the Diseases of Women and Children.
Dr. Stone	Physics and Natural Philosophy.
Dr. Payne	Materia Medica, and Therapeutics.
Dr. Stone	Forensic Medicine and Hygiene.
Mr. C. Stewart	Comparative Anatomy.
Mr. A. W. Bennett	Botany.
Dr. Wm. Rhys Williams	Mental Diseases.

TEACHERS OF PRACTICAL SUBJECTS.

Dr. Ord Dr. Harley	Practical Physiology.
Dr. Bernays	Practical Chemistry.
Mr. Croft	Practical and Manipulative Surgery.
Dr. Greenfield	Morbid Anatomy and Practical Pathology.
Mr. F. Mason Mr. W. W. Wagstaffe Mr. Rainey Mr. Reid and Assistants	Demonstrations in Anatomy.
Dr. Greenfield	Demonstrations of Morbid Anatomy.

REGISTRARS.

Medical—Mr. W. Verdon. *Surgical*—Mr. S. Osborn.

CURATOR OF THE MUSEUM.
Mr. C. Stewart.

LIBRARIAN.
Mr. E. H. Denison.

MEDICAL SECRETARY.
Mr. Whitfield.

DEAN OF THE MEDICAL SCHOOL.
Dr. Peacock.

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FEES FOR ATTENDANCE ON THE LECTURES AND ON THE PRACTICE OF THE HOSPITAL.

The Admission Fee to Hospital Practice and Lectures is £40 for the first year, a similar sum for the second, £20 for the third, and £10 for each succeeding year; or £105 at one payment, for unlimited attendance.

Gentlemen entering at St. Thomas's in the second year of their Studentship pay £40 for that year; £25 for the third year; £15 for the fourth year; and £10 for each succeeding year. Students entering in their third year pay £30; for the next year £15; and for every succeeding year £10.

The Fee for attendance on the general subjects required of Students in Dental Surgery is for the two years £45, or by instalments £40 for the first year, and £10 for the second year.

The Winter Session will commence on the 1st of October, and terminate on the 25th of March.

The Summer Session will commence on the 1st of May, and terminate on the 31st July.

The different Courses of Lectures, or the Hospital Practice, may also be attended separately on the following terms:

For Medical and Surgical Practice.

Either Medical or Surgical.		Combined on one Payment.	
Three months	5 Gs.	Three months	8 Gs.
Six ditto	9 „	Six ditto	14 „
Nine ditto	12 „	Nine ditto	19 „
Twelve ditto	15 „	Twelve ditto	24 „
Perpetual	25 „	Perpetual	40 „

Fees for separate attendance on practice in Diseases peculiar to Women, Ophthalmic Surgery, and Dental Surgery, for three months, 2 Guineas.

For Lectures and Demonstrations.	1 *Course.*	*Perpetual.*
Medicine, Surgery, Physiology, Anatomy, Dissections, Chemistry	5 Gs.	8 Gs.
Midwifery	4 „	6 „
Materia Medica, Botany, Physics, Forensic Medicine, General Pathology, and Comparative Anatomy	3 „	4 „
Mental Diseases, Ophthalmic Surgery, Dental Surgery	2 „	3 „
Practical Chemistry, Practical Surgery, Practical Physiology	3 „	

Extra Charges and Expenses.

The perpetual ticket admits to only one course of Practical Chemistry, and each Student attending the Class will be required to pay a fee of a Guinea and a half, as a contribution towards the cost of material used by him and of instruments supplied.

Each Student attending the Class of Practical Physiology will be required to pay a fee of One Guinea and a half for the use of articles supplied. It will also be necessary that he shall be provided with a Microscope.

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Each Student attending the Class of Morbid Anatomy and Practical Pathology will be required to pay a fee of Half a Guinea for reagents and necessary apparatus.

Each Student attending the Course of Practical and Manipulative Surgery will be required to pay for the parts of the bodies upon which he may himself operate, at the same rate as for subjects for dissection.

The Clinical Clerks must provide themselves with a Stethoscope and Registering Clinical Thermometer. The Dressers are required to have a Registering Clinical Thermometer, a Pocket Case of Instruments, and a Case of Catheters.

Each Student wishing to make use of the Library will be required to pay a fee of One Guinea for the whole period of his Studies at the Hospital.

The fee for Students attending the course of Practical Chemistry for nine months is 25 Guineas, and for shorter periods 3 Guineas per month.

Instruction in Pharmacy and Pharmaceutical Manipulation, to meet the requirements of the Royal Colleges of Physicians and Surgeons, and of the Society of Apothecaries, is given in the Dispensary of the Hospital by the Apothecary, Mr. R. W. JONES. The fee for this course of instruction is 5 Guineas for three months.

Preliminary Scientific Instruction.

Special Classes in the subjects required for the Preliminary Scientific Examination at the University of London will be held from January to July, and will include all the subjects required, as follows:

Mechanical and Natural Philosophy .	W. H. STONE, M.B. Oxon.
Chemistry	A. J. BERNAYS, M.A.
Botany	A. W. BENNETT, M.A., B.Sc. Lond.
Zoology and Comparative Anatomy .	C. STEWART, M.R.C.S., F.L.S.

Fee to Students of the Hospital, 6 guineas.
To others . . . . 10 „
Fee for any single subject . 3 „

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PRIZES, APPOINTMENTS, AND OTHER HONORARY DISTINCTIONS.

The Examinations upon which the Prizes and Appointments are conferred, are held at the end of the Winter and Summer Sessions.

The Award of every Prize and Appointment is contingent on the good conduct and proficiency of the Candidate.

ENTRANCE SCHOLARSHIPS IN NATURAL SCIENCE.

Two Scholarships, of the value of £60 and £40, will be awarded during the first week in October, after an examination in Physics, Chemistry, Botany, and Zoology.

THE WILLIAM TITE SCHOLARSHIP.

This Scholarship, founded by the late Sir William Tite, C.B., M.P., F.R.S., and endowed with £1000 Consols, producing £30 per annum, is awarded each year to the Student placed highest in the first class list in the examinations at the end of the Winter Session. Preference, in case of equality between Students, is to be given to the son of a medical man, and more particularly of one who has been educated at St. Thomas's Hospital or is in practice in Bath.

THE MUSGROVE SCHOLARSHIP.

This Scolarship, founded by Sir John Musgrove, Bart., the President of the Hospital, and endowed with £1400 Consols, producing 40 Guineas per annum, is awarded biennially to the Student who shall take the highest place in the first class list in the examinations at the end of the Second Winter Session. It is tenable for two years, provided the holder obtains a place in the first class in the subsequent examinations.

A COLLEGE SCHOLARSHIP.

A Scholarship, of the value of 40 Guineas, which will also be tenable for two years, will be given alternately with the Musgrove Scholarship, to the Second Year's Student placed highest in the first class list, at the end of the Winter Examinations.

Gentlemen obtaining these Scholarships are not precluded from receiving any of the Prizes awarded at the subsequent periodical examinations.

The Cheselden Medal,

Founded by the late *George Vaughan, Esq.*, is awarded annually to a Third Year's Student, in respect of a special Practical Examination in Surgery and Surgical Anatomy.

The Mead Medal,

Founded by *Mr.* and *Mrs. Newman Smith*, is awarded annually to a Third Year's Student, in respect of a special Practical Examination in Medicine.

The Treasurer's Medal

Is given annually by the *Treasurer* to the Third Year's Student who has attained the greatest proficiency during the whole course of his medical studies.

The Grainger Testimonial Prize,

Of the value of £20, is offered biennially to Third or Fourth Year's Students for a Physiological Essay, illustrated by preparations to be retained in the museum of the Hospital.

The Solly Medal,

With a Prize of at least 10 Guineas, is offered biennially, for Reports of Surgical cases, to a Third, Fourth, Fifth, or Sixth Year's Student.

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Students of each year are classed according to their respective merits in the examinations; those in the *first* class in each year receive Certificates of Honour.

All Students have the opportunity afforded them of being engaged in the performance of practical duties in connection with the Medical, Surgical, Obstetrical, Ophthalmic, and Pathological Departments of the Hospital.

Obstetric Clerks are from time to time appointed. Each holds office for a fortnight, and Certificates of Honour are awarded to those Gentlemen who have satisfactorily attended Fifty Maternity cases.

Two or more Gentlemen are selected from Students who have completed their Second Winter Session, to act as Assistants in the Dissecting Room.

Two House Physicians, Two House Surgeons, and a *Resident Accoucheur,* are selected from Gentlemen who have obtained their professional diplomas; they hold office for three or six months. These Officers, together with the Dressers and Obstetric Clerks, are provided with Rooms and Commons during their period of attendance in the Hospital, free of expense.

Two Hospital Registrars, at an annual Salary of £40 each, are appointed in each year. Preference will be given to Gentlemen who have been distinguished for merit, and have completed their studies in the School. The payment of the Registrars is subject to the presentation of a Report upon the Practice of the Hospital, and to such Report being regarded as satisfactory by the Medical Officers to whom it shall have been referred.

Students have access, with the permission of the Officers under whose superintendence they are placed, to the Museums of Human and Comparative Anatomy and Pathology—of Materia Medica—of Botany—and of Chemistry and Mineralogy—and to the Laboratories of Practical Physiology and Practical Chemistry.

THE FOLLOWING PRIZES WILL BE AWARDED DURING THE YEAR 1875—76.

TWO ENTRANCE SCHOLARSHIPS IN NATURAL SCIENCE, OF THE VALUE OF SIXTY AND FORTY POUNDS.

FOR FIRST YEAR'S STUDENTS.

WINTER.			SUMMER.		
1st.	The William Tite Scholarship	£30	1st.	College Prize	£15
2nd.	College Prize	£20	2nd.	Ditto	£10
3rd.	Ditto	£10	3rd.	Ditto	£5

FOR SECOND YEAR'S STUDENTS.

WINTER.			SUMMER.		
1st.	Musgrove Scholarship	£42	1st.	College Prize	£15
2nd.	College Prize	£20	2nd.	Ditto	£10
3rd.	Ditto	£10	3rd.	Ditto	£5

FOR THIRD YEAR'S STUDENTS.

WINTER.

1st. College Prize £20. 2nd. Ditto . . £15. 3rd. Ditto . . £10.

The Solly Medal and Prize, The Grainger Testimonial Prize, The Mead Medal, The Cheselden Medal, The Treasurer's Gold Medal.

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TIMES OF ATTENDANCE ON THE HOSPITAL PRACTICE AND LECTURES.

IN-PATIENTS are admitted DAILY, at Eleven o'clock.

The Times of Attendance of the PHYSICIANS AND SURGEONS *on the In-Patients are as follows:*

	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.
DR. PEACOCK	...	½ to 9	...	...	½ to 9	...
DR. BRISTOWE . . .	...	...	½ past 8	...	...	½ past 8
DR. MURCHISON . . .	...	...	8	...	...	8
DR. STONE	½ past 9	...	...	½ past 9	...	...
DR. GERVIS	...	9	...	...	2	...
MR. SIMON	...	...	½ past 9	...	...	½ past 9
MR. SYDNEY JONES . . .	...	8	...	...	8	...
MR. CROFT	8	...	...	8	...	...
MR. MAC CORMAC . . .	8	...	...	8	...	...
MR. LIEBREICH	3	...	...	3	...	...

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SURGICAL OPERATIONS are performed on Wednesdays and Saturdays, at 1.30 p.m., and on Saturdays, at 9.30 a.m.

OUT-PATIENTS are seen daily by the Assistant-Physicians and Assistant-Surgeons at half-past 12 o'clock.

Dr. J. HARLEY attends on Tuesday and Friday.
Dr. ORD on Monday and Thursday.
Dr. PAYNE on Wednesday and Saturday.
Mr. MASON on Monday and Thursday.
Mr. ARNOTT on Tuesday and Friday.
Mr. WAGSTAFFE on Wednesday and Saturday.

Out-Patients with Diseases of the Skin are seen by Dr. PAYNE, on Thursdays, at half-past 12 o'clock.

Diseases of Women and Children, occurring amongst *Out-Patients*, are treated on Fridays by Dr. GERVIS, and Wednesdays by Dr. CORY, at half-past 12 o'clock.

Children under seven years of age are also seen by Dr. CORY, on Saturdays, at half-past 12 o'clock.

Vaccination is performed under the direction of Dr. CORY, on Wednesdays, at half-past 12 o'clock.

Ophthalmic cases are seen as Out-Patients by Mr. LIEBREICH at 3 o'clock daily, and the Operations are performed on Thursdays, at the same hour.

Instruction in *Dental* Surgery is given by Mr. ELLIOTT and Mr. RANGER, on Tuesdays and Fridays, at 10 o'clock.

The Medical and Surgical *Casualty Out-Patients* are seen by the Resident Assistant-Physician, the Resident Assistant-Surgeon, the House Physician, House Surgeon, and Dressers, at from 12 to 1 o'clock daily.

In addition to the Clinical instruction given in the Wards by the Medical and Surgical Officers during their visits, *two or more Clinical Lectures* are delivered in each week.

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Distribution of Prizes for the Past Sessions,

Saturday, July 3rd, 1875, *Three o'clock p.m., by*

THE VERY REVEREND THE DEAN OF WESTMINSTER.

PRIZES FOR SUMMER SESSION OF 1874.

SECOND YEAR'S STUDENTS.

Introduced by Dr. STONE.

J. F. NICHOLSON, *Brigg, Lincolnshire*, COLLEGE PRIZE £15, and Certificate of Honour.

FIRST YEAR'S STUDENTS.

Introduced by Dr. BERNAYS.

G. B. LONGSTAFF, *Wandsworth* ... COLLEGE PRIZE £15, and Certificate of Honour.
C. E. SHEPPARD, *South Kensington*... DITTO £10, and Certificate of Honour.
F. H. WEEKES, *Southampton* ... ... DITTO £5, and Certificate of Honour.

PRIZES FOR WINTER SESSION OF 1874-75.

THIRD YEAR'S STUDENTS.

Introduced by Mr. CROFT.

J. F. NICHOLSON, *Brigg, Lincolnshire*, COLLEGE PRIZE £20, and Certificate of Honour.

SECOND YEAR'S STUDENTS.

Introduced by Mr. MAC CORMAC.

C. E. SHEPPARD, *South Kensington* .. COLLEGE PRIZE £20, and Certificate of Honour.
F. H. WEEKES, *Southampton* ... ... DITTO £15, and Certificate of Honour.
W. H. BATTLE, *Hanwell, Lincolnshire* DITTO £10, and Certificate of Honour.

FIRST YEAR'S STUDENTS.

Introduced by Dr. J. HARLEY.

J. SHAW, *Clapham Road* ... ... COLLEGE PRIZE £20, and Certificate of Honour.
H. CASTLE, *Newport, Isle of Wight*... DITTO £15, and Certificate of Honour.

PHYSICAL SOCIETY'S PRIZES.

Students Introduced by Mr. WAGSTAFFE.

G. F. POYNDER, *Clapham*... ... ... SOCIETY'S THIRD YEAR'S PRIZE, and Certificate of Honour.
S. J. SHARKEY, *Galway* ... ... SOCIETY'S SECOND YEAR'S PRIZE, and Certificate of Honour.
G. B. LONGSTAFF, *Wandsworth* ... SOCIETY'S FIRST YEAR'S PRIZE, and Certificate of Honour.

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PROSECTORS.

Students Introduced by Mr. F. MASON.

F. R. BARKER, *Aldershott*... ... ... PRIZE, and Certificate of Honour.
C. K. MORRIS, *Spalding, Lincolnshire* PRIZE, and Certificate of Honour.

RESIDENT ACCOUCHEURS.

Introduced by Dr. GERVIS.

H. S. BENNETT, *Finsbury Square* ... Certificate of Honour.
C. M. TAYLOR, *Wraby, Yorkshire* ... Certificate of Honour.

GRAINGER TESTIMONIAL PRIZE.

Student Introduced by Dr. ORD.

H. P. POTTER, *Denmark Hill* ... ... PRIZE £20, and Certificate of Honour.

SURGERY AND SURGICAL ANATOMY.

Students introduced by Mr. SYDNEY JONES.

J. F. NICHOLSON, *Brigg, Lincolnshire*, THE CHESELDEN MEDAL, founded by the late GEORGE VAUGHAN, Esq.
T. FISHER, *St. Michael's* ... ... PRIZE, and Certificate of Honour.

PRACTICAL MEDICINE.

Student Introduced by Dr. BRISTOWE.

J. F. NICHOLSON, *Brigg, Lincolnshire*, THE MEAD MEDAL, founded by Mr. and Mrs. NEWMAN SMITH.

HOUSE PHYSICIANS.

Introduced by Dr. MURCHISON.

A. S. L. NEWINGTON, *Ticehurst* ... Certificate of Honour.
J. W. CLARKSON, *Surbiton* ... ... Certificate of Honour.
W. S. MAVOR, *London* ... ... Certificate of Honour.
A. LINGARD, *Derby* ... ... Certificate of Honour.

HOUSE SURGEONS.

Introduced by Mr. SIMONS.

J. CROSSMAN, *Bideford* ... ... Certificate of Honour.
C. M. TAYLOR, *Wraby, Yorkshire* ... Certificate of Honour.
G. F. ROSSITER, *Taunton* ... ... Certificate of Honour.
J. W. CLARKSON, *Surbiton* ... ... Certificate of Honour.

FOR GENERAL PROFICIENCY AND GOOD CONDUCT.

Student Introduced by Mr. FR. LE GROS CLARK.

J. F. NICHOLSON, *Brigg, Lincolnshire*, THE TREASURER'S GOLD MEDAL, and Certificate of Honour.

DR. PEACOCK, *Dean*. R. G. WHITFIELD, *Medical Secretary*.

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